ENTREPRENEURSHIP EDUCATION:

EFFECT OF A TREATMENT IN UNDERGRADUATE COLLEGE COURSES ON ENTREPRENEURIAL INTENT AND IDEATION

A DISSERTATION

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

DOCTOR OF EDUCATION

BY

ROBERT D. MATHEWS

DISSERTATION ADVISOR: DR. ROGER D. WESSEL

BALL STATE UNIVERSITY

MUNCIE, INDIANA

DECEMBER 2017

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ABSTRACT

DISSERTATION PROJECT: Entrepreneurship Education: Effect of a Treatment in Undergraduate College Courses on Entrepreneurial Intent and Ideation

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Entrepreneurship programming has become a very popular choice among higher education students the past three decades. Entrepreneurial intent is consistently regarded as the greatest predictor of entrepreneurial behavior and success of entrepreneurial education programs, while ideation is viewed as a key skill needed for successful entrepreneurial behavior. Problem solving is also a key skill in both the ideation process and entrepreneurship, and was a unique demographic variable examined in this study. Despite the widespread discussion of entrepreneurial intent in the literature, very few studies have reported the actual impact of entrepreneurship education on entrepreneurial intent, and none have discussed the impact of entrepreneurship programming on openness to ideation or problem solving style effect on entrepreneurial intent. This study examined the impact of a 150-minute divergent activity training session and new venture ideation exercise on openness to ideation and entrepreneurial intent in undergraduate college students enrolled in entrepreneurship courses. The effect of demographic variables on both entrepreneurial intent and openness to ideation were also reported, with an emphasis of problem solving style effect on entrepreneurial intent. These measures come together in this study to help further explain how entrepreneurship program leaders and educators can drive more impactful entrepreneurial behavior in students. In this

study, both entrepreneurial intent and openness to ideation significantly increased in students after the brief 150-minute intervention. In addition, this study yielded a number of salient findings with relation to demographic variable effect on entrepreneurial intent. Problem solving style, gender, entrepreneurship education, and entrepreneurship exposure all had a significant effect on both pre- and post-test entrepreneurial intent. This research study infers that entrepreneurial self-efficacy of ideation and opportunity recognition skills are critical to increased entrepreneurial intent in college students, and that exercises such as the ones conducted in this study can positively impact openness to ideation and entrepreneurial intentions among students. Recommendations for future research and practice are provided.

DEDICATION

To my wife, my partner, my confidant, Julie, the only one who truly knows the faith, sacrifice, battle, grit, and determination it took to conquer this challenge.

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It is difficult to put to words my transformation over my six years in this doctoral program. I went from someone emphatically scared of research to someone competent in and appreciative of the literature. I have had some great professors and classmates, and many wonderful helpers, mentors, encouragers, and supporters along the way. I am very well aware that this accomplishment is way beyond me. I am so appreciative of the opportunity Dr. Mulvihill and the admission committee granted me by admitting me to this program.

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CHAPTER 1: INTRODUCTION

What is the intended purpose or outcome of entrepreneurship? Most assume it is all about starting a for-profit businesses (Morris, 2016), but is that a misconception and narrow-minded assumption? Starting a for-profit business venture is no doubt a part of the true scope of entrepreneurship, but that application alone falls vastly short in describing the term. Entrepreneurship is a discipline, framework, and way of thinking that is present in essentially every segment of society. At its core, it is a mindset (Kuratko, 2016a) and a lifestyle (Morris, 2016). Morris asserted entrepreneurial behavior is driven by four attributes: it includes stages and steps of action, it can be learned, it can be applied to any setting, and most importantly, it creates value by solving a need, want, or problem in a new way. Consequently, entrepreneurship can range from an incremental process change at literally any team, institution, or company of any size imaginable, to a completely socially-driven venture, or to a high growth for-profit venture, or literally anything in between. Further, entrepreneurial behavior can be as simple as one person's innovative solution in the lives of those in his or her immediate social structure. Thus, perhaps the best summary of entrepreneurship is the following: Dipiazza (2016) asserted: "the purpose of entrepreneurship, while it certainly has a self-serving element to it, is primarily service to others" (para. 3).

Entrepreneurship curricula in higher education have grown dramatically over the last two decades, and that growth and significance of entrepreneurship education in the United States and globally is well documented (Andreas & Willem, 2015). The field of entrepreneurship started in just a handful of pioneering colleges and universities a mere 30 years ago, but has since exploded, as more than 4,000 institutions of higher education around the world now offer programs in entrepreneurship (Kuratko, 2016b). With nearly 400,000 students enrolled in

college entrepreneurship courses across the U.S. (Clark, 2013), Aulet (2013) said a systematic approach to teaching entrepreneurship is critical moving forward.

Sanchez (2013) raised a simple—yet profound—assumption regarding this explosive growth of entrepreneurship education: entrepreneurs can be made. Many other researchers confirmed this assumption (e.g., Schenkel, D'Souza, & Braun, 2014). Rideout and Gray (2013) investigated published studies over the past decade to determine if sufficient evidence had been provided to assert that entrepreneurship education is indeed producing entrepreneurial activity. They went on to argue that—despite its widespread popularity—the academic world knows very little about entrepreneurship education. Others have asserted that traditional entrepreneurial education tools, such as business plan preparation, need to be replaced, or at the very least substantially augmented (Honig, 2004).

Others have noted the shortcomings of entrepreneurship education. Corbett (2005) pointed to the research gap in entrepreneurship education tactics, and introduced the concept of exploiting learning asymmetries (knowledge, cognition, and creativity) in the entrepreneurship education process. Specifically, he examined the potential impact of experiential learning on opportunity identification and exploitation as integral parts of the entrepreneurial process. He asserted that knowing how entrepreneurship students develop certain cognitive behaviors and knowledge structures will enhance their ability to recognize and exploit opportunities. Entrepreneurial alertness, information asymmetry and prior knowledge, social networks, personality traits, and the type of opportunity drive entrepreneurial opportunity recognition (Ardichvili, Cardozo, & Ray, 2003). This includes special interest and general industry knowledge and customer problem and market knowledge (Corbett, 2005).

The peak in popularity of entrepreneurship is converging with societal and industry demands on higher education to produce more adaptive critical thinkers (Kuckertz, 2013; Welsh & Tullar, 2014). Higdon (2005) argued students must have an entrepreneurial mindset to set themselves apart in the marketplace. Welsh (2014) posited that entrepreneurship teaches these essential skills the best of any academic discipline. However, traditional entrepreneurship education has been slow to recognize that true entrepreneurship revolves around teams rather than individuals (West, 2007). Entrepreneurship educators can leverage the power of collaborative learning and collective cognition through deliberate efforts that put an emphasis on building cognitively diverse teams (Basadur & Head, 2001), and putting them to work on experiential new venture projects (Kuckertz, 2013).

Given ongoing debates about how to best imbed entrepreneurship into higher education (Hannon, 2013), entrepreneurship educators must take chances at unproven methods to engage in what is referred to as meshing of thoughts and ideas (Morris, Kuratko, & Pryor, 2014).

Statement of the Problem

Encouraging entrepreneurial awareness—exposing students to the self-employment as a career option—is a common approach to entrepreneurship education, but the overall impact of entrepreneurship education is very much still in debate despite its popularity (Fretschner & Weber, 2013). Empowering entrepreneurial intent—one's desire to start a business or be self-employed—is likely the best measure of the impact of entrepreneurship education on students (Bae, Qian, Miao, & Fiet, 2014). However, it is unknown what the best ways are to positively or negatively influence entrepreneurial intent. Using experiential learning techniques centered on ideation-evaluation of new venture concepts hold promise in moving the needle on motivating towards a decision on intent.

Purpose of the Study

The purpose of this study was to investigate the influence of deliberate practice of an experiential learning exercise in new venture ideation in undergraduate college entrepreneurship courses on student entrepreneurial intent and ideation. The study also examined demographic (gender, race, age, problem solving styles, educational experiences, and business experience) correlations to openness to ideation and entrepreneurial intent.

Research questions for this study include:

1) Is there an increase in openness to ideation after the deliberate practice of an experiential learning exercise in ideation?
2) Is there an increase in entrepreneurial intent after the deliberate practice of an experiential learning exercise in ideation?
3) After students engage in deliberate practice of an experiential learning exercise in ideation, does a change in openness to ideation correlate to a change in entrepreneurial intent?
4) Do demographic variables (i.e., gender, race, age, problem solving profiles, educational experiences, and business experiences) influence openness to ideation?
5) Do demographic variables (i.e., gender, race, age, problem solving styles, educational experiences, and business experiences) influence entrepreneurial intent?

Research hypotheses for this study are as follows:

1) Deliberate practice of an experiential learning exercise in ideation increases openness to ideation in college students.
2) Deliberate practice of an experiential learning exercise in ideation increases entrepreneurial intent in college students.

3) After an experiential learning treatment in ideation is administered, a change in openness to ideation correlates with a change in entrepreneurial intent.
4) Pre-test openness to ideation is influenced by demographic variables (i.e., gender, race, age, problem solving styles, educational, and business experiences); post-test openness to ideation is not further influenced by demographic variables (i.e., gender, race, age, problem solving styles, educational experiences, and business experiences).
5) Pre- and post-test entrepreneurial intent is influenced by demographic variables (i.e., gender, race, age, problem solving styles, educational experiences, and business experiences).

Significance of the Study to the Field

This study is important to the field of entrepreneurship in higher education because it provides valuable insights into the effect of brief training and exercises in divergent activity and new venture ideation on student openness to ideation and entrepreneurial intent.

The peak in popularity of entrepreneurship is converging with societal and industry demands on higher education to produce more adaptive critical thinkers (Kuckertz, 2013; Welsh & Tullar, 2014). Others have suggested students must have an entrepreneurial mindset to set themselves apart in the marketplace (Higdon, 2005). Welsh (2014) posited that entrepreneurship teaches these essential skills the best of any academic discipline. However, traditional entrepreneurship education has been slow to recognize that true entrepreneurship revolves around teams rather than individuals (West, 2007). Entrepreneurship educators can leverage the power of collaborative learning and collective cognition through deliberate efforts that put an emphasis on building cognitively diverse teams (Basadur & Head, 2001), and putting them to work on experiential new venture projects (Kuckertz, 2013).

While entrepreneurs may have certain dispositions, attributes, and prior knowledge (Ardichvili et al., 2003), most scholars agree entrepreneurs are not born, but rather made (e.g., Schenkel et al., 2014). Given this assumption, aspiring student entrepreneurs can strive towards expert status—being among the very best in a given field (Ericsson, 2008)—through training (Krueger, Reilly, & Carsrud, 2000) and practice. This heightens the need to provide opportunities for students to deliberately practice (Ericsson, 2008) key skills and ways of thinking that lead to successful entrepreneurial behavior (Dew, Read, Sarasvathy, & Wiltbank, 2009). Given experts have different levels of key skills, including networking, financial, marketing, evangelism, leadership, team building, and general entrepreneurial mindset, educators should strive to build these skills in students through a variety of experiential methods (Morris, 2016). Entrepreneurship educators can fill several gaps that currently exist in entrepreneurship education to better inspire students toward entrepreneurial intentions. Gaps asserted by Chen, Greene, and Crick (1998)—lack of skill efficacy, supportive environment, coaching, resources, or opportunity—can all be addressed by providing real opportunities through a project-based environment that offers skill-building, coaching and support mechanisms.

Perhaps the first step towards more effective entrepreneurship education is a paradigm shift towards reframing the definition of entrepreneurial activity. Instead of focusing on merely implementing a new business, educators should challenge themselves to consider whether or not students would be better served with opportunities to learn how to think and behave more entrepreneurially, thus developing ideation (Basadur, Runco, & Vega, 2000) and opportunity alertness skills (Puhakka, 2011). This can be achieved by training students in Basadur's and Gelade's (2003) creative problem-solving process. Such training will break down the

entrepreneurial self-efficacy issues associated with the intimidating nature of starting a new venture, thus providing students with a true foundational skill set and entrepreneurial self-efficacy, which will ultimately empower them to decide how to best use their newly formed entrepreneurial mindset and alertness in their lives.

Within this study, literature encompassing experiential learning (Kolb, 2014), deliberate practice (Bloom, 1985; Ericsson, Krampe, & Tesch-Romer, 1993) and planned behavior (Ajzen, 1985) was presented to build a collective robust theoretical framework that informs the study of creativity and ideation (e.g., Ames & Runco, 2005) and entrepreneurial intent (e.g., Schenkel et al., 2014) in the higher education setting—particularly in entrepreneurship or entrepreneurial mindset (e.g., Higdon, 2005) education. Experiential learning (Kolb, 2014) and deliberate practice (Bloom, 1985; Ericsson et al., 1993) theories served as the foundation that explains tools and disciplines, while planned behavior (Ajzen, 1985) and self-efficacy (Bandura, 1997) psychology was used as a foundation for entrepreneurial intentions (e.g., Schenkel et al., 2014). Finally, ideation (e.g., Ames & Runco, 2005) explained the behavior and activities that also contribute to entrepreneurial intent.

Definition of Terms

Convergent activity – reduction in ideas with sensitivity for judgment, realism, an economic feasibility.

Deliberate Practice (DP) – a commitment to practicing a given skill or craft for a defined period of time in an effort to move towards expert status (Ericsson, 2008).

Divergent activity – Brainstorming many ideas without regard for judgment, logic, or reality.

Experiential learning – style of learning where the learner takes ownership of the learning process by engaging in a given task (Kolb, 2014).

Experiential learning exercise – in the context of this study, this refers to students engaging in an exercise where they practice coming up with their own ideas for new business ventures, and also practice converging down to their best ideas.

Expert status – becoming among the very best in a given field of work (Ericsson, 2008).

Entrepreneurial behavior – making entrepreneurship a lifestyle choice by constantly seeking problems and solving problems through way of life innovations.

Entrepreneurial education – traditionally thought of as the practice of educating students on the new venture process, but progressing towards entrepreneurial skills of problem finding, problem formulation, solution formulation, and solution implementation.

Entrepreneurial intent – measurement of a person's intentions to start a new business venture.

Ideation – a continuous process with a goal towards action of brainstorming (diverging) many new ideas, converging down on the best ideas, reframing the ideas, diverging from the new ideas, converging down on the best ideas, and action-planning towards implementation.

Innovation – new and novel ways of completing tasks, constructing products, or improving processes with an eye towards efficiency and enhanced way of life.

New venture – in the context of this study, new entrepreneurial business, project, or organization of ideas created by the student to be used through the course of the experiential learning process.

Openness to ideation – measures an individual's attitude towards actively engaging in the ideation process.

Planned behavior – an individual's behavior intentions, based on social norms, perception of the behavior being considered, and likelihood of outcomes (Ajzen, 2002).

Problem solving profile – an individual's personal preference and style in daily functions and problem-solving situations.

Self-efficacy – an individual's positive or negative beliefs about completing a specific task based on experience, past successes or failures, successes or failures of role models, and encouraging or discouraging social pressures (Bandura, 1997).

Dissertation Organization

This dissertation is organized into five chapters. Chapter Two consists of a review of the literature, which includes theoretical frameworks, ideation, and entrepreneurial intentions. Chapter Three outlines the proposed study, including data collection and analysis techniques. Chapter Four provides study findings. Finally, Chapter Five provides discussion, including interpretation and application of the results. In addition, Chapter Five outlines study limitations and suggestions for future studies.

CHAPTER 2: LITERATURE REVIEW

Summary of the Project

Creativity and proactive ideation increase entrepreneurial desirability (Zampetakis, 2008). Evidence from other disciplines suggests college instructors can enhance creativity with training (White, Wood, & Jensen, 2012). Ideation process training has improved divergent and convergent thinking skills in organizations (Basadur, Graen, & Green, 1982; Runco & Basadur, 1993). Specifically, a one-week training session increased preference for ideation in professionals (Basadur et al., 1982). Ames and Runco (2005) posited: "it would be reasonable to encourage and support entrepreneurial potentials via programmes that target ideation" (p. 311). This statement by Ames and Runco not only indicates investigation into ideation and entrepreneurial intent is prudent, but it also implores the academy to engage in these types of studies to better understand the relationship between the two variables.

This study investigated the influence of deliberate practice (Ericsson, 2008) of an experiential learning (Kolb, 2014) exercise in new venture ideation in college entrepreneurship courses on student entrepreneurial intent and ideation. Students were trained on creativity, ideation, and new venture proposals, and were guided through individual and team new venture ideation-evaluation processes. Students provided self-report information on openness to ideation and entrepreneurial intent instruments via a pre- and post-test method.

Theoretical Frameworks

This literature review blends discussion of experiential learning (Kolb, 2014), Deliberate Practice (DP; Bloom, 1985; Ericsson et al., 1993), planned behavior (Ajzen, 1985), and self-efficacy (Bandura, 1997) theories in a robust theoretical framework that informs the study of creativity and ideation (e.g., Ames & Runco, 2005) and entrepreneurial intent (e.g., Schenkel et

al., 2014) in the higher education setting—particularly in entrepreneurship or entrepreneurial mindset (e.g., Higdon, 2005) education. Experiential learning (Kolb, 2014) and deliberate practice (Bloom, 1985; Ericsson et al., 1993) theories served as the basis to create the intervention in the study, while planned behavior (Ajzen, 1985) and self-efficacy (Bandura, 1997) theories informed entrepreneurial intentions (e.g., Schenkel et al., 2014) and openness to ideation (Basadur, 1995; Basadur & Finkbeiner, 1985). In addition, ideation (e.g., Ames & Runco, 2005) served as a critical skill and behavior that heavily contributes to entrepreneurial activity and intent.

In this literature review, theories of planned behavior and self-efficacy, the foundation for the study of entrepreneurial intentions, are discussed first, followed by experiential learning and deliberate practice theories, which serve as the foundation of the intervention administered in this study. This is followed by discussion of entrepreneurial intent and then creativity and ideation, key skills in the field of entrepreneurship.

Theory of Planned Behavior

Theory of Planned Behavior (TPB; Ajzen, 1985) is a salient predictor of entrepreneurial intent in the literature (e.g., Engle et al., 2010; Fretschner & Weber, 2013; Kautonen, van Gelderen, & Fink, 2013; Sanchez, 2013; Yang, 2013). Other factors, such as self-efficacy theory (Bandura, 1997), entrepreneurial alertness (Kirzner, 1979), and ideation (Basadur & Finkbeiner, 1985) also encourage entrepreneurial intent.

Experiential Learning Theory (ELT; Kolb, 2014) is the most widely validated and accepted learning model (Manolis, Burns, Assundani, & Chinta, 2013). ELT has roots in constructivism, as experiential learning is, according to Benander (2009): “making meaning from direct experience” (p. 36), where students learn from doing and take ownership of their learning

process (Groves, Leflay, Smith, Bowd, & Barber, 2013; Yardley, Teunissen, & Dornan, 2012), leading to more self-directed and self-regulated learning (Sibthorp et al., 2011).

Theories of Reasoned Action and Planned Behavior

TPB (Ajzen, 1985) is well documented in the extant literature as a prime predictor of behavioral intentions (e.g., Ajzen, 1991; Kautonen, van Gelderen, & Tornikoski, 2013). TPB is borne from the Theory of Reasoned Action (TRA), which posits that intentions are antecedents to actual behavior, and are informed by a set of beliefs based on perceived outcome of the behaviors being considered (Fishbein & Ajzen, 1975; Madden, Ellen, & Ajzen, 1992). Ajzen (1985) said people will have higher intentions to behave if they develop a positive attitude toward the behavior, and if they believe others around them view this behavior as desirable activity, thus developing perceived suggestive social norms (Sheppard, Hartwick, & Warshaw, 1988). Ajzen (1992, 2002) found attitudes and norms inform behavioral intentions, and intentions subsequently are antecedents of behaviors. Behavioral intentions represent one's readiness to behave, while the behavior is a response based on one's perception.

While widely accepted as a sound predictor of behavioral intentions, authors questioned TRA because it solely focused on volition as a driver of behavior, failing to address circumstances serving as barriers between intention and actual behavior (Ajzen, 1985). To further explain predictability of behavioral intentions, Ajzen (1985, 1991) introduced Perceived Behavioral Control (PBC) to further develop his existing body of work on attitudes and behavioral norms, or TRA, to develop TPB. PBC addressed the incongruence between genuine intents, barriers to intent due to control issues, and subsequent behavior.

Attitudes towards behaviors are a function of one's beliefs towards the behaviors being considered (Ajzen, 1985; Fishbein & Ajzen, 1975). Individuals will form attitudes toward

certain behaviors based on the negative and positive assessments of those behaviors and their estimated or perceived probable outcomes. This is a personal evaluation driven by the individual's psychological make-up, as TRA does not determine the soundness of the evaluation of behaviors.

Social norms influence intentions and ultimately behavior in that a person will form a set of beliefs about how she thinks society in general will respond to a certain behavior (Ajzen, 1985, 1991; Fishbein & Ajzen, 1975). People will determine what is acceptable in society, and make judgments based on their positive or negative thoughts associated with those perceived social norms. Subjective norms go a step further, as individuals form perceptions of how significant others in their lives will view the proposed behavior. A very salient example of this in the entrepreneurship space is the intense pressure on family members—whether perceived or manifested verbally or physically—to join a family business (Sharma, Chrisman, & Chua, 2003).

Given many circumstances are out of the immediate control of individuals, and thus impede behavioral follow-through of intentions, PBC was a key advancement beyond TRA, as it allows for better prediction of behavior (Madden et al., 1992). PBC is largely dependent on confidence—and ultimately self-efficacy—in being able to effectively or satisfactorily engage in and carry out a given task (Ajzen, 1991, 2002).

Theory of Self-Efficacy

Fishbein and Cappella (2006) argued that TPB originated from self-efficacy theory (Bandura, 1997), which developed out of Bandura's (1977) social construct theory. Researchers have further asserted the convoluted space including PBC, self-efficacy, and locus of control in essence measure the same thing, which is one's perception surrounding their ability to carry out a

specific task at a perceived acceptable level (Judge, Erez, Bono, & Thoresen, 2002). Others have concluded that PBC and self-efficacy are one in the same (Fishbein & Capella, 2006).

Ajzen (2002) built TPB on the premise of both internal and external controllables, which markedly lean on self-efficacy. He postulated: "all else equal, a high level of perceived control should strengthen a person's intention to perform the behavior, and increase effort and perseverance" (p. 667). Ajzen borrowed from the Rosenstock's (1966) work on barriers to develop PBC and ultimately TPB (Ajzen, 2002). PBC ultimately focuses on the perceived ease of pursuing and executing a behavior or task. TPB has been most commonly used to explain health decisions, such as quitting smoking, eating healthy, exercising, or using prophylactics (e.g., Ajzen, 2002; Ajzen & Sheikh, 2013; Fishbein & Capella, 2006), but in the last decade has emerged as a competent tool in exploring entrepreneurial intentions (e.g., Engle et al., 2010; Kautonen, van Gelderan, & Fink, 2013; Kautonen, van Gelderan, & Tornikoski, 2013).

Self-efficacy is affected by four factors (Bandura, 1997). First, experience either increases or decreases self-efficacy. Successes breed heightened self-efficacy, while failures lead to reduced self-efficacy. The second factor is modeling, or vicarious experience. People believe they can successfully accomplish tasks because they have watched others do so. Third—much like social norms influencing behavioral intent in TRA and TPB—social pressures and persuasion bring about encouragement or discouragement towards achieving a task, thus impacting self-efficacy. Finally, physiological factors also influence self-efficacy. Individuals who are able to harness and channel their psychological and bodily reactions to stress in a positive manner will grow from those experiences and notice increased self-efficacy.

Generalized self-efficacy takes a broader stance, and considers how effectively an individual believes she can engage in a variety of tasks (Judge et al., 2002). What distinctly sets

generalized self-efficacy apart from self-efficacy theory is the psychological nature in which someone is willing to take on new tasks in an effort to advance himself, learn, and even persevere from previous hardships or failures. Though not empirically studied at near the volume of self-efficacy, generalized self-efficacy has still been tested in nearly 200 studies, and could prove to be a poignant identifier of entrepreneurial tenacity in future research.

Experiential Learning Theory

Experiential Learning Theory (ELT) is the most widely validated and accepted learning model (Manolis et al., 2013). ELT has roots in constructivism, as experiential learning is "making meaning from direct experience" (Benander, 2009, p. 36), where students learn from doing, and take ownership of their learning process (Groves et al., 2013; Yardley et al., 2012), leading to more self-directed and self-regulated learning (Sibthorp et al., 2011). ELT was founded from the foundational theories of Dewey, Boydston, and Ross (1983), Lewin (1939), Piaget (1973), James (1904), Jung (1960), and Rogers (1951), and based on the following propositions (Kolb & Kolb, 2005): learning is a process, learning is the process of assessing student beliefs and retesting them, learning calls for reconciliation of differences, conflict and disagreement, learning is a "total person" (p. 194) adaptation process involving thinking, feeling, perceiving and behaving, learning is a process of interaction between person and environment, and learning is the knowledge creation process.

Dewey et al. (1983) and Piaget's (1973) theories particularly stand out in defining ELT. Dewey's theory of experience posited learning is most effective when enjoyable and goal relevant (Sibthorp et al., 2011). Honig (2004) said: "equilibrium is how Piaget describes our attempt to create a balance between the environment and existing circumstances" (p. 261). This theory is acutely relevant in entrepreneurship, as students—aspiring entrepreneurs—must work

through a process where they wrestle with the environment around them (Krueger et al., 2000), such as market demands, customers and supply chain, as well as their personal circumstances, such as specialty and industry knowledge, experience, capital, and professional network.

Kolb's (2014) ELT process is a cycle of learning through experience, reflection, thought, and experimentation through concrete experience, reflective observation, abstract conceptualization, and active experimentation modes. Concrete (direct) experience represents apprehension in his model, while abstract conceptualization represents comprehension, or symbolic interpretation. Active experimentation causes transformation through extension, while reflection brings about transformation through intention. Extension involves testing, while intention is internal reflection (Corbett, 2005).

Deliberate Practice Theory

Bloom. Bloom's (1985) work supports this notion of active experimentation. His research team found extremely higher performing (i.e., expert status) children's talents—based on national awards and recognition—are developed through a process that would later be coined Deliberate Practice (DP), as opposed to high performers being born that way. The study was a four-year endeavor conducted out of the University of Chicago by a team of researchers. They interviewed high performing individuals gifted in four distinct talent areas: athletic or psychomotor, aesthetic, musical, and artistic, cognitive or intellectual development, and interpersonal relations, distributed among six groups: Olympic swimmers, world-class tennis players, concert pianists, sculptors, research mathematician, and research neurologists. They also interviewed the high performers' parents to learn more about their initial support network. Participants had already attained expert status (e.g., if a swimmer were to be interviewed, that

person had to have made the Olympic team) and were under 35 years of age in hopes memories of practice regimens still being intact.

The theoretical underpinning for this study is that high performance status attainment applies to 95% of the population, as 2-3% have severe emotional or learning disabilities that prevent them from working towards expert status, while the other 1-2% have exceptional natural gifts that make them abnormally capable (Bloom, 1976). Bloom (1985) postulated:

> Perhaps the major value of this study is that it documents new insights into human potential and the means by which it is translated into actual accomplishment . . . the quality of life on individuals having a sense of fulfillment in one or more roles and fields of human endeavor. The development of both excellence and standards of excellence in a society is dependent upon the extent to which society offers opportunity and encouragement. (p. 18)

Ericsson and colleagues. Ericsson et al. (1993) expanded on Bloom's work with their own studies, and referred to the work required to attain expert status as DP. Ericsson served as the editor and was also on the team that assembled *Cambridge Handbook of Expertise and Expert Performance* (Ericsson, Chamness, Feltovich, & Hoffman, 2006). The publication, which features nearly 1,000 pages and outlines more than 100 studies in a wide variety of professions on DP, points back to and expands on the themes in Bloom's study.

Expert status takes a minimum of 10 years of intense practice (Ericsson et al., 1993); ultimately, amount of DP will drive level of performance. In later work, Ericsson, Prietula, and Cokely (2007) defined the most "intense" and demanding practice activities of experts as two hours daily; this involves perfecting already attained skills and extending the scope of yet to be mastered skills. Ericsson (2008) also explained the keys to gaining expertise and expert

performance revolve around intensity, quality and quantity of practice, structure, immediate feedback, problem solving, evaluation, expert coaching, and repeat performance opportunities. DP is central to learning, particularly working on skills at which one is not particularly skilled (Coughlan, Williams, McRobert, & Ford, 2014). All of these activities together in a system or process lead to behavior refinement (Ericsson et al., 2007).

Other crucial elements of DP include ground level support (parents, teachers, family, and coaches), expert coaches (e.g., a former Olympian), deliberate thinking (cognitive exercise) about the craft, and seeking and absorbing often-painful feedback (Bloom, 1985). Finally, Ericsson et al. (2007) emphasized that DP efforts should be viewed as being on a continuum; that anyone could work towards expert status and improve baseline skills to the best of their ability.

Applied deliberate practice. Based on the available literature, DP appears to be most prevalent in higher education in the medical field. Medical simulations in higher education have gained favor in recent decades (Saunders, 1997). DP through simulation-based training leads to greater accumulation of clinical skills than traditional classroom training (Wayne et al., 2006; Wayne, Barsuk, O'Leary, Fudala, & McGaghie, 2008; Wayne, Didwania et al., 2008). Medical educators have also found simulation-based clinical DP to be superior to traditional clinical medical education that lack specific and purposeful DP (McGaghie, Issenberg, Cohen, Barsuk, & Wayne, 2011). They noted physicians-in-training learn a great deal from merely being assigned to patients with conditions (practical experience) rather than deliberately assigned or sought learning experiences (i.e., classroom). However, they also posited these programs could be even more impactful with more deliberate assignment, coaching and follow through. In other words, hospitals excel at the "P" (practice) portion of DP, but could better address the structure and coaching, or "D" (deliberate) side of DP (van de Wiel, van den Bossche, Janssen, & Jossberger,

2011). Finally, they found medical students have significantly better attitudes towards their medical communication education when DP teaching methods are used (Koponen, Pyorala, & Isotalus, 2012).

DP is also very prevalent in the arts. Krampe and Ericsson (1996) investigated the age effects of DP in conjunction with age-related skill deterioration. They found skill deterioration among musicians through age to be normal, but noted the experts not only decline at a much slower rate, but are also able to rely on their mastery and DP of the craft to essentially not allow their declining skills to be as evident to an audience. Interestingly, children who enjoyed early musical success but failed to achieve high levels of success later in life all have parents who became satisfied with those early successes and did not encourage continued DP of the craft towards mastery (Lehmann & Ericsson, 1997).

DP entails tasks and practice that takes pupils to places of discomfort, creating a rather significant distance between them and their respective comfort zones (Ericsson et al., 2007). This is common among high performing athletes, where expert coaches often push athletes far past what they think they can handle. This explains why shorter, slower, and smaller athletes—in certain situations—can outperform their taller, faster, and bigger competitors, as they have likely engaged in a great deal of highly structured and rigorous DP (Baker, Cote, & Abernethy, 2003; Helsen, Starkes, & Hodges, 1998; Johnson, Tenebaum, & Edmonds, 2006).

The very nature of education lends itself to DP. Teachers go through many cycles of research and preparation, as well as classroom instruction and facilitation, followed by subsequent reflection, examination of student and peer evaluations, and more research and preparation. This cycle is ongoing for teachers. If they are intentional with their practice and self-improvement, they are essentially engaging in DP. Researchers have found effective

teaching is driven more by desire and DP towards improvement than the actual traits of the teacher (Dunn & Shriner, 1999). Bronkhorst, Maijer, Koster, and Vermunt (2011) found expert teachers all view DP in teaching as student and teacher learning. They noted the expert educators will have a desire to learn as much as to teach, and all are heavily motivated towards continuous improvement.

For entrepreneurs, DP is defined as any activities with explicit purpose to build the business owners' knowledge and skillsets as related to their industry and running their business (Unger, Keith, Hilling, Gielnik, & Frese, 2009). Thus, DP is a key indicator of entrepreneurial knowledge. In turn, DP is also said to drive business growth.

While DP in entrepreneurship and entrepreneurship education is relatively unexplored, researchers are starting to examine its value. Sull (2004), through his in-depth, case study-based research of small and emerging firms, developed a theory on disciplined entrepreneurship. He posited it is important to exercise creativity and discipline in harmony to conceptualize, launch, stabilize, and grow ventures. DP has also been shown to improve crisis decision-making (McKinney & Davis, 2003), an important element in entrepreneurial development.

DP has faced some minor opposition. For instance, some have argued other factors, such as cognitive ability, will drive elite performance among chess players. However, they still conceded elite chess players achieve expert performance through a minimum of 3,000 hours of DP, and thus acknowledged DP is a key behavior trait with nearly all expert players (Campitelli & Gobet, 2011). Others have acknowledged the power of DP, but argued practicing the same thing with extreme repetition is not effective towards achieving expert status, instead prescribing for blocked and random practice schedules (Carter, 2013).

Entrepreneurial Intent

Theory of Planned Behavior Studies

This study examined whether entrepreneurship education will move students towards or away from intending to behave entrepreneurially. Most researchers who ventured into the entrepreneurial intent space found TPB highly explains entrepreneurial intentions (e.g., Engle et al., 2010; Fretschner & Weber, 2013; Kautonen, van Gelderan, & Fink, 2013; Sanchez, 2013; Yang, 2013). However, most entrepreneurship scholars also agree entrepreneurship education's impact on entrepreneurial intentions is still largely untested in the literature (Schenkel et al., 2014). Some authors found attitude within the TPB framework to be the best predictor of entrepreneurial intent (Yang, 2013), while others reported mixed reviews on the influence of attitude in entrepreneurial intentions (Zhang, Wang, & Owen, 2015). Yang (2013) and Zhang et al. (2015) posited that social norms and PBC positively impact entrepreneurial intentions.

Some researchers focused their work on social pressures and standards, and found social norms—including family pressures and the perceived glamour of owning a business in contrast with the possible challenges of making the decision to start a business—to be the most salient TPB construct in predicting entrepreneurial intent (Engle et al., 2010; Fretschner & Weber, 2013). Further, the link between entrepreneurial intentions and prior family business experience (Carr & Sequeira, 2007), strong pressure to remain in the family firm, and poignant desire to keep family businesses alive through appointing the right family successor is particularly intense. Interestingly, the perception of the level of pressure felt by the successor typically outweighs the actual pressure applied by the family owner looking to pass the business to the next generation (Sharma et al., 2003). Finally, financial decision-making in family firms is positively related to TPB (Boyd, Botero, & Fediuk, 2014; Koropp, Kellermanns, Grichnik, & Stanley, 2014),

providing evidence that positive entrepreneurial experiences lead to increased entrepreneurial intentions and subsequent behavior (Basu & Virick, 2008).

Entrepreneurial Self-Efficacy and Perceived Behavioral Control

The concept of prior experience increasing entrepreneurial intent is not limited to family business. Corporate entrepreneurial intent among emerging firms is driven by skills and efficacy gained from both individual and collective team experiences that affect the company environment, and thus motivates leaders and employees to intend to behave entrepreneurially (Fini, Grimaldi, Marzocchi, & Sobrero, 2010). In fact, intent evolves and strengthens with experience because of increased generalized and entrepreneurial self-efficacy (Gird & Bagraim, 2008). The reason for the increase in entrepreneurial intentions is attributed to a marked increase in entrepreneurial self-efficacy (Hmieleski & Corbett, 2008). Hmieleski and Corbett's research honed in on the power of improvisational behavior leading to greater entrepreneurial intent and positive follow-up behavior and results. They posited positive improvisational behavior does not happen without high entrepreneurial self-efficacy. Sawyer's (2007) discussion of group genius and group flow, which is discussed later, supports this claim. Some studies have focused on the experience of founders, which proved to be the difference in their higher entrepreneurial self-efficacy in relation to non-founder managers (Chen et al., 1998). Growth and opportunity build experience, which leads to higher self-efficacy, future growth aspirations, and increased entrepreneurial intentions (Kraaijenbrink & Groen, 2012). Further, entrepreneurs' decisions and feelings about various opportunity ebbs and flows are based on their attributed self-efficacy in the expertise area of those given opportunities (Matthias & Williams, 2012). This experience gap presents a distinct challenge for entrepreneurship educators, but other pockets of research that focus on innovation and risk-taking shed some light on this test.

Chen et al. (1998) posited that entrepreneurship education programs have focused on marketing, management, and financial control attributes of entrepreneurial self-efficacy, while largely ignoring innovation and risk-taking. They assert because of this gap in teaching and educational experiences, students lack overall entrepreneurial self-efficacy. Despite students and recent graduates exhibiting above average self-efficacy in marketing, management, and financial control skills, their lack of entrepreneurial self-efficacy in the two key areas of innovation and risk-taking lead to weak overall entrepreneurial self-efficacy. Chen et al. argued these deficiencies point back to TPB and PBC, as they said: "entrepreneurial self-efficacy is a belief based construct and is about personal control" (p. 310). Others augmented entrepreneurial self-efficacy with the missing attributes of innovation and risk-taking as well, but also added proactiveness towards entrepreneurial opportunities (Sanchez, 2013; Segal, Borgia, & Schoenfeld, 2005; Wood, McKinley, & Engstrom, 2013; Zhang et al., 2015), which provides a glimpse into exactly how intent leads to actual behavior.

The academy has also used cognitive style and cognitive biases to better inform entrepreneurial intent and entrepreneurial self-efficacy. Cognitive style influences stability in entrepreneurial intent and behavior. Analytic entrepreneurs tend to be more stable in their decision making towards pursuit of entrepreneurial opportunities, as they rely more on their managerial, marketing and financial control skills, while holistic entrepreneurs are typically less predictable in terms of how they will pursue opportunities, likely because they have a higher risk tolerance, and thus a higher level of generalized self-efficacy (Dutta & Thornhill, 2008).

Cognitive biases also heavily play into potential entrepreneurs' intentions. Biases include overconfidence, illusion of control, and belief in the law of small numbers. Overconfidence bias is prevalent among entrepreneurs with intentions—particularly those who progress to actual

behavior—and is tied back to risk perception (Forbes, 2005; Simon, Houghton, & Aquino, 2000). Illusion of control bias is linked to PBC, while belief in the law of small numbers bias informs both overconfidence and control. Belief in small numbers refers to entrepreneurs basing their decisions on limited experiences (Simon et al., 2000). This also reiterates the value of experience—regardless of depth—in arriving at heightened levels of entrepreneurial self-efficacy (Gird & Bagraim, 2008). Finally, Simon et al. noted overconfidence is not an altogether negative bias, as it initially allows someone the opportunity to take risks and become an entrepreneur, thus gaining valuable experience towards future opportunities in the process.

Few scholars have addressed boundaries to entrepreneurial intent. Schlaegel and Koenig (2013) examined barriers to entrepreneurial intent through the context of TPB and Entrepreneurial Event Model (EEM; Shapero & Sokol, 1982), through a competing intent model lens. Schlaegel and Koenig integrated the competing models and developed the concept of contextual boundary conditions, which moderated perceived desirability, propensity to act, and perceived feasibility from the EEM and entrepreneurial self-efficacy and PBC from the TPB. While they found contextual barriers discouraged intent, they did not address what specific barriers. Other researchers found economic constraints and government policy to be barriers to entrepreneurial intent (Engle, Schlaegel, & Dimitriadi, 2011; van Gelderen et al., 2006). Intent constraints in entrepreneurship education include low self-efficacy regarding the skills necessary to engage in entrepreneurial activity, and a lack of a supportive environment, coaching, resources, or opportunity (Chen et al., 1998).

Emergent Factors in Entrepreneurial Intent

Scholars in emergent research examining entrepreneurial intent postulated that mindset (Schenkel et al., 2014; Solesvik, Westhead, Matlay, & Parsyak, 2013) and orientation (Frese &

Gielnik, 2014; Schenkel et al., 2014) drive intent. Further, intensity of that mindset dictates the likelihood of intent and subsequent action (Schenkel et al., 2014; Solesvik et al., 2013). Orientation involves autonomy, innovativeness, risk-taking, competitive aggressiveness, and proactivity (Lumpkin & Dess, 1996).

This notion of mindset was built from entrepreneurial alertness and awareness underpinnings. Kirzner (1979) defined entrepreneurial alertness as the ability to notice entrepreneurial opportunities in everyday life with little or no effort. While alertness appears to be a skill on the surface, it is deeply embedded on a psychological level (Frese & Gielnik, 2014). Entrepreneurial alertness equates to an awareness of opportunities, which drives action (Uy, Chan, Sam, Ho, & Chernyshenko, 2014). The antithesis of this is an optimizer, such as an accountant, who would more than likely have very low levels of entrepreneurial alertness (Karabey, 2012). Educational experiences can encourage alertness and proactivity, leading to intent (Valliere, 2013). Puhakka (2011) posited that alertness is a process including information gathering, information interpretation, and evaluation and application of new knowledge towards exploitation of opportunities. Some authors have argued that alertness is at the very essence of entrepreneurship (Tang, Kacmar, & Busenitz, 2012). Brockman (2014) argued alertness is linked to creativity and ideation, but that scholars have essentially ignored this connection.

Creativity, Innovation, Problem Solving, Divergent Thinking, and Ideation

Given ideation is a key talent for entrepreneurs (Ames & Runco, 2005), the question arises as to whether or not creativity can be taught and practiced. Further, assuming ideation can be taught and practiced, a natural question is centered on ideation teaching and practice changing students' openness to ideational behavior. Finally, the next question pertains to the practice of ideation and its influence on entrepreneurial intent.

Convoluted Terminology Surrounding Creativity

Before examining the intricacies of the ideation process, it is important to provide context in the complex space of creativity literature. Terms such as creativity, creative cognition, problem solving, innovation, divergent thinking, and ideation are exceedingly intertwined (Chegeni, Darabi, & Niroomandi, 2016). This is largely due to the enormous complexity of creativity in relation to human condition. Fundamentally, creativity is a cognitive behavior (Runco, 2004). Perhaps that is why creativity has been so vigorously studied among many disciplines—including the arts, psychology, entrepreneurship, engineering, and management, among others—since Guilford's (1950) groundbreaking presidential address to the American Psychological Association on the power of creativity, and its importance to American culture and the field of psychology.

Innovation is typically defined as the end result of creativity that can be infused into society (Basadur & Goldsby, 2016). The process that transforms ideas into valuable products is referred to as ideation (Runco & Basadur, 1993). Ideation includes divergent thinking and convergent activity, which is often referred to as evaluation.

Creativity

Early research focused on the direct link between intelligence and creativity, but Barron and Harrington's (1981) work resulted in a marked shift of focus to correlates, benefits, and conditions of creative behavior (Runco, 2004). Sternberg (2001) referred to creativity as the interaction between intelligence and wisdom (application of experience), but Sternberg himself said: "creativity thus seems to go way beyond intelligence" (p. 360), as intelligent people can produce products that are not novel.

Even Guilford (1950) himself likely could not have predicted just how important creativity would be to the current social climate. Runco (2004) posited creativity is one of the key behaviors and skills of contemporary culture because of the necessity to keep pace with rapid technological and cultural advancements. He articulated creativity is the human response to keep up with the perpetual evolution of human interaction. Other scholars also pointed to the extreme importance of creativity and creativity research to the global culture and economy (e.g., Simonton, 2012).

Runco (2014) argued against the tendency of scholars in the literature to gravitate to a big-C, little-c dichotomy because he wanted to stress that creativity should not be categorized, as incremental innovations are what allow society to cope with the rapid rate of cultural advancement (Runco, 2004). As one would expect, big-C refers to expansive, explosive, far-reaching, or even life altering innovations and innovators, while little-c refers to small, incremental creative advancements and creative individuals. Runco (2014) argued such activity should not be ranked, and he and his colleagues stressed the importance of everyday creativity (Runco, Plucker, & Lim, 2001), i.e., a creative lifestyle. Others injected the importance of also recognizing mini-c, or the constructivist process of individuals creatively navigating their knowledge and understanding of the world around them in an ongoing fashion (Beghetto & Kaufman, 2007). Smith (2005) preceded Runco (2014) in expressing concern with this trend, stating:

> The stress laid on worthwhile, even profitable products has led creativity research to focus on exceptional accomplishments as if Nobel laureates and their equals in other fields were the prime prototypes of creative behavior. Aside from the guess that all Nobel Prize winners are not necessarily creative, the exclusive focus on the sphere of

> excellence and fame tends to exclude important aspects of human behavior from creativity research. Creative functioning can, naturally, be a constituent part of all human activity. (Smith, 2005, p. 293)

Entrepreneurial behavior naturally aligns with constructivist philosophy, as entrepreneurs make meaning of the world around them in an effort to provide solutions that have the potential to impact their environment and greater society (Goldsby & Mathews, 2015).

Though no one definition of creativity exists, most researchers agree that it must involve originality and effectiveness (Runco & Jaeger, 2012). In the context of creative outputs, others define originality as novel and interesting, and effectiveness as economic value (e.g., Smith, 2005). Despite the wide popularity of the two-sided definition of creativity centered on uniqueness and effectiveness, Smith went on to argue that the utility or value assessment should not define creative endeavors.

> For creativity research to remain part of the greater domain of psychology it should divest itself of the utility aspect. Creativity should be defined by the novelty of its products, not by their usefulness, value, profitability, beauty, and so on. What is not useful now may become useful in a distant future. Even if it is never applied for the benefit of mankind it may, in principle, be called creative in so far as it has developed in dialogue with the conception of reality it is intended to replace. (p. 294)

Though Smith somewhat contradicted himself in this statement by pointing to future utility, his point is sensible, and supported the notion that divergent thinking only thrives when judgment is deferred in the creative process (Basadur, Runco et al., 2000). However, in the context of innovation, which is the useful output of creativity (Maranville, 1992), it is apparent different disciplines may require different interpretations of creativity. Further, as illustrated in the quote

from Smith above, the end conclusions of those interpretations may not be as far apart as they would initially appear.

Csikszentmihalyi (1996) found the creative process involves five phases: preparation, incubation, insight, evaluation, and elaboration. Preparation involves being exposed to and immersed in a given domain and problem or set of challenges. In the incubation step, ideas generated towards solutions to these problems are housed in the creative person's subconscious. Third, insight brings about clarity, where the details of the ideas start to come together. In the evaluation phase, the creator must decide if the effort it will take to bring about the change is worth pursuing. Finally, the creator must validate his or her solutions. In this phase, domain and field can bring about significant barriers.

While some psychology scholars have pronounced a strong link between psychoticism and creativity (Eysenck, 1993), others have disagreed (Runco, 2004). Some suggest these dissenting scholars have defined creative outputs as having effectiveness or value because they fear the scholarship of creativity may not be taken seriously due to the psychoticism links (Simonton, 2012). Csikszentmihalyi (1993) argued psychoticism and creativity merely overlap, while others posited creativity may involve subtle psychotic behaviors in the creative process as opposed to creativity being directly related to the psychotic person (Runco, 2004).

Entrepreneurial behavior and activity requires utility, as it finds, solves, and delivers on market-based problems to deliver value (Basadur & Goldsby, 2016). This could manifest itself as a new for-profit venture, a new socially-oriented or non-profit venture, a new business unit, or—behaviorally speaking—an evolving way of being or doing.

The academy has largely agreed everyone has the ability to think creatively (Chegeni et al., 2016), as—to this point—a genetic basis for creativity has not been determined (Runco et al.,

2011). This is largely because intelligence cannot wholly explain creative behavior (Runco, 2004). Further, both hemispheres of the brain (Runco, 2004; Yoruk and Runco, 2014) are involved in divergent thinking, and unconscious and subconscious thought are also significant contributors to creative endeavors (Ritter, van Baaren, & Dijksterhuis, 2012; Simon, 1996; Smith, 1995).

Seminal framework by Rhodes (1961) helped explain why intelligence alone does not explain creativity. He offered the four P's as a way of examining creativity: person, process, press, and product. Studies on person centered on characteristics of the individual person, such as traits, personality, styles, and behaviors, among others. Scholarship in process was more mechanical in nature, and considered both social structures as well as creative processes used to bring a new idea to being through a complicated blending of domains and disciplines. Many have expanded on this concept to bring about discipline in the ideation phase of innovation (Runco, 2004). Press refers to the creative pressures—both positive and negative—as people interactive with their environmental surroundings. Examples of press influences include cultural norms, social pressures, market and economic limitations, work environment, time, family, fear of failure, and models (Rhodes, 1961).

In light of the societal pressures to not go against the norm, the investment theory of creativity (Sternberg, 2006; Sternberg & Lubart, 1991, 1995) postulated that creative individuals are willing to assert themselves in the face of this social pressure in order to reap the benefits of buying low and selling high—a stock market analogy. Sternberg (2001) stated: "creativity forms the antithesis of the dialectic, questioning, and often opposing societal agendas, as well as proposing new ones" (p. 360). These realities align closely with challenges in entrepreneurship, as entrepreneurs face many obstacles and social pressures as they design a new product, service,

or business model. Finally, product referred to physical outcomes of creativity in Rhodes' model. Runco argued over time these product measures have become too closely aligned with workplace productivity. Others have since expanded on Rhodes' product paradigm to include service innovation (Zeng, Proctor, & Salvendy, 2009), business model development (Sandstrom & Bjork, 2010), and new venture creation (Basadur & Goldsby, 2016).

Emergent literature has incrementally expanded on Rhodes' (1961) framework. Glaveanu (2013) offered the five A's approach, which he posited augment the lopsided focus on the individual in Rhodes' paradigm. Glaveanu argued by focusing on actor, action, artifact, audiences, and affordances, researchers could better step out of the isolation of studying the individual, and instead examine the many moving parts of creativity, as various actors interact with their environment and each other. This model advanced the notion of process to action as set in the context of societal implementation, artifact of culture as opposed to just a utilitarian product, and audiences and affordances in terms of interdependence between creators and society in lieu of simply pressures affecting the individual. Nakamura and Csikszentmihalyi (2001) were heading in the direction of Glaveanu when they said: "creativity is constituted by forces beyond the innovating individual" (p. 337).

Csikszentmihalyi (1999) also posited that creativity goes far beyond cognitive abilities, and is largely influenced by emotion and cultural and social factors. He prescribed domain, field, and the creative person as the three main parts of creativity (Csikszentmihalyi, 1996). Domain describes the barriers to creativity as a set of symbolic rules and procedures. Field is the collection of gatekeepers in a given space or discipline who will decide whether or not to accept a creative person's work. According to Csikszentmihalyi, the creative person is very complex and not easily defined or predicted. He said genetic disposition is a factor, particularly when

combined with specific domains, as well as upbringing and exposure to various biases and lifestyles. Access to the field is also a key factor in acting on creativity.

Collaborative Learning and Collective Cognition

This concept of collective creativity is real-world in that many actors come together to influence innovation. For example, the technically uninformed voice of the customer is often used to gain insights in product development. This also reinforces the concept that everyone can be creative and contributes to societal advances, and that a variety of voices must be heard to realize creative success (Kristensson & Magnusson, 2010).

Sawyer and DeZutter (2009) referred to group creativity as distributed creativity or distributed cognition, where creativity goes beyond the brain and into interpersonal activity. Sawyer (2007) referred to this phenomenon as group flow and group genius, as blending of creative ideas on teams lead to spontaneous, unexpected creative results. As such, scholarship in collaborative learning and collective cognition provides a strong foundation for entrepreneurial learning to take place in small teams and community.

Collaborative learning, a pedagogy joining students on teams to work together on a larger goal, yet individually performing somewhat autonomous tasks (Curseu & Pluut, 2013) as a part of the group function, has emerged as a popular and effective tool in education (Dowell, Cade, Tausczik, Pennebaker, & Graesser, 2014). Collaboration is a critical piece of learning and creativity, and should naturally flow from the higher education system to the professional world (Hall & Weaver, 2001). Brining students together on diverse teams does not assure positive learning outcomes or results. This is especially true when leadership and organizational deficiencies lead to relationship conflict and social loafing (Curseu & Pluut, 2013).

Collaborative programs that are deliberately organized in nature (Dunne & Peck, 2012; Mason & Watts, 2012) focus on problem solving and lead to more creative (valuable) outcomes. Because problem solving requires high cognitive load (Kirschner, Paas, Kirschner, & Janssen, 2011), interaction is the key element of collaborative learning. Discourse analysis has shown teams that engage in deep conversations develop a better understanding of the problem space, and thus learn more in the process. This also leads to significantly better individual and group performance (Dowell et al., 2014). Student satisfaction levels are high when interactions are deep, and particular satisfaction areas include socialization, cohesion, work habits, responsibilities, professional development, and group learning (Oncu & Ozdilek, 2013).

Group learning and decision effectiveness and efficiency (speed of decisions) increases with collective wisdom or collective cognition (Eckstein et al., 2012). Kirschner et al. (2011) concluded individuals realized better learning (outcomes and efficiency) when studying worked examples, whereas groups achieved a higher learning efficacy when solving problems, which supports the notion of collective cognition. Hung (2013) said: "today, much problem solving is performed by teams, rather than individuals. The complexity of these problems has exceeded the cognitive capacity of any individual and requires a team of members to solve them" (p. 365). Thus, collective group problem solving ability is greater than that of the sum of individual group members. Further, true cognition is only realized in group, cultural, and environmental settings, because in reality it is shared or distributed.

The success of collective cognition is dependent on member self-efficacy and ultimately group efficacy. The group and its members must collectively believe they can perform required tasks effectively and cohesively. This correlates to the imperative need of a deliberate plan, goals, and structure present in collaborative learning, as this clarity brings confidence and

ultimately efficacy (Gibson & Earley, 2007). This concept borrows heavily from social cognitive theory, which marries knowledge, self-efficacy, and action (Bandura, 1997). Group efficacy largely depends on balancing emotions, which in turn affects learning and project outcomes. How members feel about the process raises efficacy, and thus performance and learning. Tools for influencing these emotions include leadership, team preparation, and group and individual training (Choi, Sung, Lee, & Cho, 2011). Individual self-efficacy also improves with group efficacy (Schaffer, Chen, Zhu, & Oakes, 2012). Other considerations include group tension, and the need to overcome that tension with common goals and preparation (West, 2007). However, in context with Schumpeter's (1942) concept of creative destruction of old ways of doing into new, more useful ways of operating—and thus bringing about economic and cultural revolution—conflict and frustration are viewed as expected emotional and social reactions to creativity and innovation.

These principles hold true in practical entrepreneurship as well. Teams often produce the best results because of their collective cognition and creativity. Considering prior knowledge and experiences are a vital contributor to creativity (Sternberg, 2006), collective experiences, prior knowledge, and ideas will drive enhanced solutions. Thus, entrepreneurship should be thought of more in a plural sense rather than its traditional individual roots, as entrepreneurial endeavors seek to solve complex, unstructured problems (Basadur & Goldsby, 2016).

Assuming all individuals have the ability to think creatively (Chegeni et al., 2016), and there are effective instruments available to measure openness to—and attitudes towards—creativity, ideation, and divergent thinking (Runco, 2004), the ability of creativity and entrepreneurship training to impact entrepreneurial intentions and potential behavior ought to be explored with vigor. This seems best accomplished by exposing students to the experiential

exploration of entrepreneurial solutions and opportunities through an ideational process. Given creativity is not fueled by talent, but rather hard work and commitment to achieving creative results (Amabile, 2001), it is important to sort through who has the most intrinsic motivation to put forth the effort to be creative, all the while providing a positive environment to encourage creative behavior.

Ideation, Divergent Thinking, and Problem Solving

Given the complexity of human creativity, it is imperative to supplement creative functions with a systematic approach to maximize outputs and efficiency. Reinig and Briggs (2006) said: "ideation is an essential component of creativity and problem-solving" (p. 20). Ideation is the creative process (Basadur et al., 1982), and involves generation, development, and communication of new innovations (Johnson, 2005). Ideation includes four steps: problem selection, problem exploration, testing alternatives, and perfecting the solution (Swenson, Rhoads, & Whitlark, 2013). In other words, ideation is the discipline phase or process that designs innovation and new venture models (Basadur & Goldsby, 2016; Sandstrom & Bjork, 2010). Ideation is a key talent for entrepreneurs (Ames & Runco, 2005). Design thinking is an innovation process centered on human attitudes. Thus, attitudes towards ideation are critical in entrepreneurial development (Goldsby, Kuratko, & Nelson, 2014).

Ideation is highly correlated with problem solving, individual and group attitudes towards problem solving (Basadur & Finkbeiner, 1985; Basadur, Pringle, Speranzini, & Bacot, 2000; Basadur & Thompson, 1986; Swenson et al., 2013), and cognitive styles (Runco & Basadur, 1993). The ability to defer judgment and engage in divergent thinking is at the heart of ideation (Basadur & Hausdorf, 1996, Basadur, Pringle et al., 2000; Runco & Acar, 2012). Using divergent and convergent behaviors together effectively is the discipline that allows creative

individuals to turn their work into novel solutions to existing problems in the field (Csikszentmihalyi, 1996).

Group ideation and idea negotiation spurs the entrepreneurial mindset and self-efficacy among team members (Kohn, Paulus, & Choi, 2011). Group creativity drives problem solving and innovation (Ray & Romano, 2013). Basadur and Runco (1994) prescribed group creativity as three basic steps of problem finding, problem solving, and solution implementation, with an iterative ideation-evaluation (diverge-converge) process serving as the mediator.

Divergent activity is the idea generation phase of ideation, with the goal of producing many ideas with uninhibited flow (Basadur, Runco, et al., 2000). Brainstorming is a type of divergent activity, but in and of itself brainstorming has been found to have very little to no value (Basadur & Thompson, 1986). It then stands to reason that divergent activities do not guarantee creativity (Runco, 2008), but a commitment to disciplined deliberate practice of truly divergent exercise can enhance creativity (Basadur, Runco et al., 2000; Bjork, Boccardelli, & Magnusson, 2010; Santanen, Briggs, & de Vreede, 2004). Basadur and Thompson (1986) also noted the most useful ideas—ideas that survive the next phase of ideation, evaluation—often surface chronologically in the last two-thirds of ideas generated during the divergent phases. Divergent exercises should move in many different directions to yield worthwhile results (Acar & Runco, 2015).

This is why deferral of judgment is critical in the divergent stages of group ideation. If judgment invades the divergent stages, individuals on the team—and in turn, the team—will most likely never display uninhibited creativity (Basadur, Runco et al., 2000), and thus likely never behave entrepreneurially. This also demonstrates why attitudes toward divergent activity are so prominent in assessing creative potential (Runco & Acar, 2012). Group and individual

ideation thrives in a very collaborative environment, where participants feel they are a part of the process (Basadur, Runco et al., 2000). Groups connected to each other and other networks produce more innovation (Bjork & Magnusson, 2009). Given intrinsic motivation is a key driver of creativity (Hennessey & Amabile, 1998; Ruscio, Whitney, & Amabile, 1998), it stands to reason participants would feel empowered to get involved in the group ideation process, knowing their individual and collective voices could and would be heard. Gemmel, Boland, and Kolb (2012) posited: "greatest ideational productivity occurs when 'trusted partners' exchange and refine ideas through a form of shared cognition" (p. 1053). Basadur (2003) posited deliberate practice of ideation leads to increased comfort with creativity and enhanced ideation skills, thus it is critical entrepreneurship educators provide students with opportunities to explore their new venture ideas both individually and in teams. This prescription is supported by the need for some level of support and autonomy within the group ideation process (Runco, 2004).

The discipline proceeding divergence and deferral of judgment is convergence. It is important for teams to switch gears and converge down on the most actionable ideas to bring value to the work done in the divergent phase (Basadur, 2003). This process takes discipline, and teams and organizations must develop selection criteria that fit their industries, institutions, and team in order to avoid overlooking the best ideas (Kudrowitz & Wallace, 2013). Basadur (2003) prescribed to team member voting, while Kudrowitz and Wallace asserted multi-voting can lead to individual selection biases. Karni and Shalev (2004) posited consideration of five key constituents when navigating the ideation-evaluation process: issue (problem being addressed), ideation mechanism (iterative tool or technique being used to innovate), creators (idea generators), judges (idea evaluators), innovativeness (salient facets used to evaluate idea quality), and measures (specific instruments used to determine value of idea outputs). By

considering the key needs and players involved in the process, teams can bring order, credibility, and value to the behavior.

The change-making process requires active, or ongoing, divergence and convergence in a disciplined manner (Basadur & Robinson, 1993). Basadur and Gelade (2006) referred to teams and organizations that successfully navigate the ideation process on an ongoing basis as "thinking organizations" (p. 49). Whether orchestrated through individuals, small teams, growing firms, or large organizations, entrepreneurial individuals, teams, and organizations realize ongoing positive results when creativity, proactive problem finding and redefinition, ideational desirability, and entrepreneurial intent are an integral part of the culture or purpose (Zampetakis, 2008).

Applied Process-driven Ideation

Basadur and Gelade (2006) postulated ideation is most effective when used in conjunction with a system that provides discipline and a path towards action. Mumford, Medeiros, and Partlow (2012) stated: "creative achievements are the basis for progress in our world" (p. 30). Problem solving is at the very core of entrepreneurial behavior and activity (Buttner & Gryskiewicz, 1993; Basadur & Goldsby, 2016). At the heart of problem solving is creativity and innovation (Basadur & Hausdorf, 1996). Team member attitudes towards creativity and innovation positively or negatively impact the effectiveness of team solutions to problems.

Basadur and Gelade (2006) presupposed creative problem solving is a four-stage process. Overlying this process is the Complex Problem Solving Process Profile (CPSP) inventory, which measures individual cognitive preferences towards problem solving (Basadur & Finkbeiner, 1985; Basadur & Gelade, 2003). Together, the process and the profiles provide

insight into team building and group adaptability based on conflicts that naturally arise as a result of cognitive diversity (Basadur, Gelade, & Basadur, 2013) and creative destruction (Schumpeter, 1942).

The Basadur complex problem solving process is circular, and includes four stages: generating, conceptualizing, optimizing, and implementing (Basadur et al., 2013). In stage one, the team seeks to define the problem by engaging in problem finding and fact-finding. Stage two involves formulating the problem through problem definition and idea finding. Teams develop solutions in stage three, which includes evaluation, selection, and planning. Stage four is defined by action, as the solution is implemented by means of gaining acceptance and then acting (Basadur & Head, 2001).

As previously mentioned, the uniqueness of Basadur's process is that is complemented by an overlying problem solving profile (Basadur & Gelade, 2003). This profile is fluid in nature based on life and work experiences, as well as current responsibilities. The profile measures individual preferences and styles with regards to problem solving, as opposed to more traditional relationship testing in the form personality traits, which tend to not change past early adulthood for most people.

Problem-solving profiles include generators, conceptualizers, optimizers, and implementers (Basadur et al., 2013). Generators are often creative, and reside in academia, the arts, and marketing, among other professions. Conceptualizers are big picture visionary thinkers, and are often engaged in strategic planning, design, market research, leadership, and project management. Optimizers work tends to involve systems and rules-based solutions, thus they work in accounting, engineering, information technology systems, purchasing, logistics, and finance positions, among others. Finally, implementers are typically front lines individuals who

reside in functions that have to make these systems work, such as customer relations, secretarial, informational technology operations, project management, sales, and management.

This is of particular interest in building entrepreneurial teams, as the vast majority of individuals who have taken the problem-solving profile identify as implementers, and Basadur's work has demonstrated that most teams are not very cognitively diverse. This is especially true with generators, as many teams completely lack these creative catalysts (Basadur & Basadur, 2011). This is likely due to the disruptive nature of creativity (Schumpeter, 1942), as it—along with cognitive diversity, as previously mentioned—often leads to group conflict (Basadur & Basadur, 2011).

Summary

In this literature review, the author introduced a multiple framework approach, including experiential learning (Kolb, 2014), deliberate practice (Bloom, 1985; Ericsson et al., 1993), and planned behavior (Ajzen, 1985) theories in a collective theoretical framework that provided a foundation for the study of creativity and ideation (e.g., Ames & Runco, 2005), and entrepreneurial intent (e.g., Schenkel et al., 2014) in the higher education setting—particularly in entrepreneurship or entrepreneurial mindset (e.g., Higdon, 2005) education. Experiential learning (Kolb, 2014) and deliberate practice (Bloom, 1985; Ericsson et al., 1993) theories served as the foundation that explained tools and disciplines, while planned behavior (Ajzen, 1985) informed the mentality that drives entrepreneurial intentions (e.g., Schenkel et al., 2014). Finally, ideation (e.g., Ames & Runco, 2005) explained the behavior and activities that also contribute to entrepreneurial intent.

CHAPTER 3: METHODS

Project Summary

Creativity and proactive ideation increase entrepreneurial desirability (Zampetakis, 2008). Evidence from other disciplines suggests college instructors can enhance creativity with training (White et al., 2012). Ideation process training has improved divergent and convergent thinking skills in organizations (Basadur et al., 1982; Runco & Basadur, 1993). Specifically, a one-week training session increased openness to for ideation in professionals (Basadur et al., 1982). Ames and Runco (2005) stated: "it would be reasonable to encourage and support entrepreneurial potentials via programmes that target ideation" (p. 311). This statement by Ames and Runco not only indicates investigation into ideation and entrepreneurial intent is prudent, but it also implores the academy to engage in these types of studies to better understand the relationship between the two variables.

This study investigated the influence of deliberate practice (Ericsson, 2008) of an experiential learning (Kolb, 2014) exercise in new venture ideation in undergraduate college entrepreneurship courses on student entrepreneurial intent and ideation. The researcher administered a one-week intervention in the courses. Students were trained on creativity, divergent behavior, ideation, and new venture proposals, and were guided through individual and team new venture ideation-evaluation processes. Students provided self-report information via demographic and pre- and post-test method openness to ideation and entrepreneurial intent instruments.

Proposed Study

The purpose of this study was to investigate the influence of deliberate practice of an experiential learning exercise in new venture ideation in undergraduate college entrepreneurship

courses on student entrepreneurial intent and ideation. The study also examined demographic (gender, race, age, problem solving styles, educational experiences, and business experience) correlations to openness to ideation and entrepreneurial intent.

Research Questions

1) Is there an increase in openness to ideation after the deliberate practice of an experiential learning exercise in ideation?
2) Is there an increase in entrepreneurial intent after the deliberate practice of an experiential learning exercise in ideation?
3) After students engage in deliberate practice of an experiential learning exercise in ideation, does a change in openness to ideation correlate to a change in entrepreneurial intent?
4) Do demographic variables (i.e., gender, race, age, problem solving profiles, educational experiences, and business experiences) influence openness to ideation?
5) Do demographic variables (i.e., gender, race, age, problem solving styles, educational experiences, and business experiences) influence entrepreneurial intent?

Research Hypotheses

1) Deliberate practice of an experiential learning exercise in ideation increases openness to ideation in college students.
2) Deliberate practice of an experiential learning exercise in ideation increases entrepreneurial intent in college students.
3) After an experiential learning treatment in ideation is administered, a change in openness to ideation correlates with a change in entrepreneurial intent.

4) Pre-test openness to ideation is influenced by demographic variables (i.e., gender, race, age, problem solving styles, educational, and business experiences); post-test openness to ideation is not further influenced by demographic variables (i.e., gender, race, age, problem solving styles, educational, and business experiences).
5) Pre- and post-test entrepreneurial intent is influenced by demographic variables (i.e., gender, race, age, problem solving styles, educational experiences, and business experiences).

Research Method and Approach

This study was quantitative (Gay, Mills, & Airasian, 2012) in nature as to establish relationships between numeric variables, using both inferential and descriptive statistics (Coladarci & Cobb, 2014; Creswell, 2014) to measure the impact of an experiential exercise—serving as the treatment—on student intent and ideation. This method was appropriate due to the emerging nature of the field of entrepreneurship education (Kuratko, 2016a, 2016b), and the study's application to new ways of thinking about teaching entrepreneurship skills (Ames & Runco, 2005).

Specifically, the researcher primarily employed a survey (Creswell, 2014) approach to address the research questions, which centered on behavioral changes after an intervention, and demographic variables effect on behavior. Creswell posited: "a survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or draws inferences to the population" (pp. 155-156). It also provided the most effective approach for gathering longitudinal data (Fowler, 2009) to assess the impact of the treatment on attitudes towards behaviors and behavioral intent related to entrepreneurship.

Research Techniques

A one-week new venture proposal ideation project treatment (Dimitrov & Rumrill, 2003) was administered to undergraduate students in college entrepreneurship courses. The first class session consisted of practice exercises in key elements of ideation, including divergence, deferral of judgment, and convergence (Basadur et al., 1982; Runco & Basadur, 1993). In the beginning of this session, students were asked to write down as many uses as they could think of for a belt in 60 seconds. Students were then exposed to content on divergent activity, and participated in exercises that encouraged and provided deliberate practice of divergent behavior and elimination of social barriers to ideation output (Basadur et al., 1990). At the end of the session, students were asked to write down as many uses as they could think of for a brick.

In the second class session, students were asked to individually diverge on new venture ideas, converge on their top 10 new venture concept ideas, and further converge down to each of their top three ideas. Students were then placed on teams of four, and asked to combine (diverge) their top three individual ideas to form 12 total ideas for the group; finally, student teams were asked to converge down to their final group new venture idea based on group discussions, refinement of ideas, meshing of ideas, and perceived feasibility. The brief one-week (two class periods separated by just one day) intervention period was critical to the reliability and validity of the data, as to limit the effect of uncontrolled influences on the dependent variables (Dimitrov & Rumrill, 2003) of openness to ideation and entrepreneurial intent.

It is important to note the researcher facilitated the entire set of treatment exercises. He is a credentialed and experienced problem solving and creativity trainer and facilitator, and an experienced entrepreneurship educator.

Population

The population for this study includes students enrolled in undergraduate college entrepreneurship courses in the United States. There are nearly 400,000 students enrolled in college entrepreneurship courses across the U.S. (Clark, 2013).

Sample

A convenience sampling approach (Gelo, Braakman, & Benetka, 2008) was used based on access to professors, institutions, and undergraduate entrepreneurship courses. Data were collected from 376 students among eight undergraduate entrepreneurship courses across three institutions of higher education. Thus, the study used a clustering method (Creswell, 2014) by employing a quasi-experiment in each course, as the sample was not random.

Setting

This study took place in courses at three state-funded institutions of higher education located in the Midwest and Southeast. All three institutions are doctoral degree granting. All three are classified as higher research activity institutions according to Carnegie (The Carnegie Classification of Institutions of Higher Education, 2016). Total student population for the three schools combined was over 52,000 at the time of the study. Two of the schools offer undergraduate major and minor degree programs in entrepreneurship through their business schools, while the third offers an undergraduate concentration in entrepreneurship.

Data Collection Procedures

All data were collected spring academic semester 2017. Students in the courses took part in the treatment described above (as part of required class activities for each course) that was preceded by an optional pre-test (prior to treatment) and followed by an optional post-test (after the conclusion of the class sessions involving the new venture ideation exercise (Dimitrov &

Rumrill, 2003) using a self-report survey method (Fowler, 2009) via Qualtrics, an online survey tool (Sue & Ritter, 2012), or paper copies in class.

The Basadur Ideation-evaluation Instrument (openness to ideation; Appendix A; Basadur, 1995; Basadur & Finkbeiner, 1985; Basadur, Runco et al., 2000) was administered to measure openness to ideation. The instrument's reliability and validity (Creswell, 2014) were established (Basadur & Finkbeiner, 1985; Basadur et al., 1982), and then strengthened over time (e.g., Basadur & Hausdorf, 1996), including being used extensively in the academy and market place (Basadur, Runco et al., 2000; M. Basadur, personal communication, November 11, 2016). The instrument was also translated and successfully used in several different languages (e.g., Basadur, Pringle, & Kirkland, 2002; Basadur, Wakabayashi, & Takai, 1992).

An adapted version of Krueger's (N. Krueger, personal communication, October 26, 2016) original Entrepreneurial New Venture Feasibility and Desirability Instrument (Appendix B; Kruger, 1993; Krueger & Carsrud, 1993) was used to measure entrepreneurial intent and exposure to entrepreneurship. The authors established reliability and validity (Creswell, 2014) in 1993, and Krueger added to the instrument with other proven surveys; those included measures of perceived desirability (Kolvereid & Isaksen, 2006), perceived behavioral control (Kolvereid, 1996a, 1996b), and entrepreneurial self-efficacy (Karlsson & Moberg, 2013).

Other demographic factors, such as age, class rank, ethnicity, gender, entrepreneurship educational experiences, academic major, and academic minor were also collected using a self-report survey method (Appendix C). This instrument was administered via Qualtrics or on paper in class as part of the pre-test.

The Basadur Creative Problem Solving Profile (Appendix D; Basadur et al., 1990) was administered through the Basadur website (www.basadurprofile.com) as well as on paper in class

to measure student problem-solving styles. For the purpose of this study, the researcher classified the results of each individual student's profile test as demographic information. The instrument was first introduced and initial validity and reliability (Creswell, 2014) were established in 1990. Further validation and reliability was presented in the literature as improvements were made (Basadur et al., 2013). The profile has been used and further validated in the academy and market place extensively over the last three decades (Basadur, Gelade, Basadur & Perez, 2016).

Three of the surveys (Ideation-evaluation Instrument, Entrepreneurial New Venture Feasibility and Desirability Instrument, and demographics) are relatively short (approximately 15-20 minutes to take in total among the three instruments), and thus, were combined into one online pre-test questionnaire tool (Sue & Ritter, 2012) to reduce requests to students and ensure the highest possible participation rate (Dillman, Smyth, & Christian, 2009). The researcher leveraged blocking, coloration, ordering, viewer consistency, and question presentation tools in Qualtrics to develop the most effective tool possible. Questions were ordered in a way as to block categories. The Ideation-evaluation Instrument was introduced first, followed by the entrepreneurial intentions instrument, and then the demographic questions. The researcher conducted all informed consent, data collection, and class exercises (treatment).

Student Testing and Treatment Process (Repeated in Each Class)

1) Class session one – Pre-test instruments—openness to ideation, entrepreneurial intent, and demographics—were solicited as one online survey through Qualtrics or on paper in class. The informed consent document was handed out, and read to the students. The Basadur Profile was administered through the Basadur Profile website or on paper. Links to both surveys were provided to students. Students without access to technology were

provided with paper surveys. Treatment began; students were exposed to creativity exercises to encourage divergent activity, and understand the role of deferral of judgment and social barriers between divergent and convergent activity. The belt (beginning of class) and brick (end of class) exercises were administered, and each student was encouraged to compare their belt and brick results to affirm improvement. The researcher administered the exercises as a credentialed and experienced problem solving and creativity trainer.

2) Outside of class prior to class session two – students were tasked with diverging/ converging on their top 10 new venture ideas.
3) Outside of class prior to class session two – students were tasked with converging down to their top three new venture ideas.
4) Class session two – students were paired into teams of four students and asked to combine each of their top three new venture ideas into 12 team new venture ideas, then diverge on those ideas through combining, morphing, and meshing their ideas. Teams converged down to their top new venture idea, reflected on the process, and described how and why they landed on their final new venture idea. The researcher administered the exercises as a credentialed and experienced problem solving and creativity trainer and entrepreneurship educator. Post-test instruments—openness to ideation and entrepreneurial intent—were solicited as one online survey through Qualtrics towards the end of class. A link to the survey was provided to students. Students without access to technology were provided with paper surveys.

The researcher secured approval for the project from Ball State University's Internal Review Board (IRB). This included permission letters from department chairs in which the data were collected from all three institutions.

Data Analysis Procedures

Data were analyzed through various statistical methods using IBM Statistical Package for Social Sciences, version 22 (IBM-SPSS), including t-test to measure individual repeated measure growth (Dimitrov & Rumrill, 2003) in openness to ideation and entrepreneurial intentions, Pearson correlation (Fitzmaurice et al., 2011) of changes in openness to ideation and entrepreneurial intentions, and one-way Analysis of Variance (ANOVA) to compare demographic factors between subjects (Belle, 2008).

Plan for Data Presentation

Data will be presented within Chapter Four in the forms of text and tables with numeric representations. Each research question will be addressed in numeric order starting with research question number one. Thus, results of statistical analyses, including both descriptive and inferential findings, will be presented for each of the research questions. Chapter Five will feature a discussion of the results.

Summary

This chapter outlined the purpose of the study, research questions and subsequent research hypotheses, and study design, setting, data collection, and data analysis procedures details. Specifically, this chapter addressed research treatments, quantitative data collection and analysis methods, population and sample details, institutions and courses included in the study, research instruments used, IRB approval, and a proposed plan for data presentation in Chapter Four.

CHAPTER FOUR: RESULTS

Project Summary

This research examined if entrepreneurship education—specifically a new venture ideation exercise—leads to increased entrepreneurial intent in students. It also attempted to predict an increase in openness to ideation in students after this exercise. The study sought to predict a relationship between a change in entrepreneurial intent and openness to ideation. Finally, this study attempted to determine if certain demographics have an effect on pre- and post-test entrepreneurial intent and pre- and post-test openness to ideation.

This study is presented in a five-chapter format. Chapter Four presents the results of this study. It includes data characteristics and a description of the population. Finally, Chapter Four describes the results of the analysis on changes in entrepreneurial intent and openness to ideation. All tables referenced in this chapter are located in Appendix E.

Population Characteristics

The researcher conducted exercises in divergent behavior and new venture ideation in 10 undergraduate class sections in entrepreneurship across three institutions. Table 1 features information on course sections researched as part of the study. The exercise lasted two class sessions (approximately 150 minutes in total per course section), and the instructors of these courses asked students to participate in the exercise and all assessments administered by the researcher. Total enrollment for these 10 sections was 562 students, but six students were enrolled in two of the courses; thus, total enrollment included 556 unique student participants. Pre- and post-tests were collected from students present. In addition, students were asked to take the Basadur Problem Solving Profile (Basadur et al., 1990). The total number of students included in this study that participated in the entire new venture ideation exercise and completed

both the pre- and post-test was 376. With the exception of the problem solving profile, all partial results were excluded from the analysis. Sixteen students who participated in the exercises and took both the pre- and posts-tests did not take the problem solving profile, but those cases were still included in the analysis, as the results from the profile test represented just one of the several demographic variables collected in the pre-test. Tables 2 and 3 include key demographic data of study participants. Of the 376 participants, 58.8% were males, 75.3% were White, 91.0% were age 18-25, 44.7% were seniors, 62.2% were business majors, 47.6% were business minors, and 43.9% were enrolled in an entrepreneurship major, minor, certificate, or extracurricular program. The researcher conducted the study and treatment across three campuses. Of the 376 participants, 286 (76.1%) were from Institution A, 70 (18.6%) from Institution B, and 20 (5.3%) from Institution C. Of the students who took the problem solving profile (n = 360), 168 (44.7%) were implementers.

Effect of a New Venture Ideation Exercise on Openness to Ideation

Tables 4 and 5 feature results of the pre- and post-test openness to ideation instrument. A paired-samples t-test was conducted to compare pre-test openness to ideation and post-test openness to ideation. Results for the pre- and post-test openness to ideation t-test are in Table 6. Results for questions one, two, five, six, seven, 10, 11, and 14 on the openness to ideation instrument were reversed for analysis purposes, as they are part of a tendency to prematurely judge subscale. This allowed for normalization with the preference for ideation subscale, and thus just one overall openness to ideation mean score (Basadur, 1995; Basadur & Finkbeiner, 1985; Basadur, Runco et al., 2000). There was a statistically significant difference between pre- ($M = 4.59$, $SD = .688$) and post-test ($M = 5.18$, $SD = .938$) conditions; $t(375)=14.102$, $p \leq .001$. These results suggest a new venture ideation exercise increases students' openness to ideation.

Effect of a New Venture Ideation Exercise on Entrepreneurial Intent

Table 7 features results of the pre- and post-test entrepreneurial intent instrument. A paired-samples t-test was conducted to compare pre-test entrepreneurial intent and post-test entrepreneurial intent. Results of the t-test for pre- and post-test entrepreneurial intent are in Table 8. There was a statistically significant difference between pre- ($M = 44.00$, $SD = 29.99$) and post-test ($M = 46.23$, $SD = 30.38$) conditions; $t(375)=2.47$; $p \leq .001$. These results suggest a new venture ideation exercise increases student entrepreneurial intent.

Correlation between the Change in Openness to Ideation and the Change in Entrepreneurial Intent after a New Venture Ideation Exercise

A Pearson correlation coefficient was calculated to assess the relationship between change from pre- to post-test openness to ideation and the change from pre- to post-test entrepreneurial intent. There was not a significant correlation between the two variables, $r = .101$, $n = 376$, $p = 0.051$. Overall, there was not a statistically significant correlation between the change in openness to ideation and the change in entrepreneurial intent.

Relationship between Demographic Variables and Openness to Ideation

This section reviews the relationship between pre- and post-test openness to ideation and select demographic variables. Tables 9 through 15 and Tables 17 through 21 feature the relationship between demographic variables and openness to ideation. Results of prior and current exposure to entrepreneurship survey items are presented in Table 16. One-way between subjects ANOVA was conducted on problem solving profile, gender, ethnicity, age, educational experiences, and business experiences effect for both pre-and post-test openness to ideation.

Problem Solving Profile

Table 9 features results of the one-way between subjects ANOVA problem solving profile effect on openness to ideation. Demographic results of the problem solving profile are reported in Table 2. Sixteen students did not take the problem solving profile, thus the sample size for this variable was 360. Due to sample size limitations, generator and conceptualizer (ideation) were recategorized together and optimizer and implementer (evaluation) were recategorized together. There was a significant effect of problem solving profile on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 359) = 3.934$, $p = .048$]. There was a significant effect of problem solving profile on post-test openness to ideation at the $p \leq .05$ level [$F(1, 359) = 5.292$, $p = .022$].

Gender, Ethnicity, and Age

Tables 10, 11, and 12 feature results of one-way ANOVA analysis of gender, ethnicity, and age effect on openness to ideation. Results for one-way ANOVA analysis of gender effect on openness to ideation are in Table 10. Two of the 376 students reported gender as "other," thus the sample size for the gender variable was 374. There was not a significant effect of gender on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 373) = .101$, $p = .751$]. There was not a significant effect of problem solving profile on post-test openness to ideation at the $p \leq .05$ level [$F(1, 373) = 1.264$, $p = .262$].

Table 11 features one-way ANOVA analysis results for ethnicity effect on openness to ideation. Due to sample size limitations, ethnicity was recategorized into White and Other. There was not a significant effect of ethnicity on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .421$, $p = .517$]. There was not a significant effect of entrepreneurial educational experiences on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .047$, $p = .829$].

Results for one-way ANOVA analysis of age effect on openness to ideation are in Table 12. Due to sample size limitations, age was recategorized into 18-25 and other. There was not a significant effect of age on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .567$, $p = .452$]. There was not a significant effect of age on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .424$, $p = .515$].

Educational Experiences

Tables 13 through 15 feature the results of analysis of variance for openness to ideation by educational experiences. Educational experiences demographics of the study participants are reported in Table 3.

Table 13 features one-way ANOVA analysis results of entrepreneurship education effect on openness to ideation. Due to sample size limitations, entrepreneurship educational experiences were recategorized into some entrepreneurship education exposure (yes) and no entrepreneurship education exposure (no) based on enrollment in an academic major, minor, certificate, or extracurricular programs in entrepreneurship. There was not a significant effect of entrepreneurial educational experiences on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 2.163$, $p = .142$]. There was a significant effect of entrepreneurial educational experiences on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 3.905$, $p = .049$].

Results for one-way ANOVA analysis of academic major effect on openness to ideation are reported in Table 14. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic major was recategorized into business school or other. There was not a significant effect of academic major on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .002$, $p = .967$]. There was not a significant effect of academic major on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 1.904$, $p = .168$].

Table 15 features the results of one-way ANOVA results of academic minor effect on openness to ideation. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic minor was recategorized into business school or other. There was not a significant effect of academic minor on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 3.101$, $p = .079$]. There was not a significant effect of academic minor on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 1.246$, $p = .265$].

Entrepreneurship Exposure

This section reviews the relationship between pre- and post-test openness to ideation and exposure to entrepreneurship. Table 16 features results from current and prior exposure to entrepreneurship survey items. Results of one-way between subjects ANOVA of current personal business ownership, prior personal business ownership, prior or current parent business ownership, prior or current employment by an entrepreneur, and prior or current other family or friend business ownership effect on openness to ideation are reported in Tables 17 through 21.

Table 17 features results from one-way ANOVA analysis of current personal business ownership effect on openness to ideation. There was not a significant effect of current personal business ownership on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .675$, $p = .412$]. There was not a significant effect of current personal business ownership on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .467$, $p = .495$].

Results for one-way ANOVA of prior personal business ownership effect on openness to ideation are reported in Table 18. There was not a significant effect of prior personal business ownership on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 1.281$, $p = .258$]. There was not a significant effect of current personal business ownership on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 2.193$, $p = .140$].

Table 19 features results from one-way ANOVA analysis of prior or current parent business ownership effect on openness to ideation. There was not a significant effect of prior or current parent business ownership on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .002$, $p = .967$]. There was not a significant effect of current personal business ownership on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .063$, $p = .802$].

Results for one-way ANOVA of current or prior employment by an entrepreneur effect on openness to ideation are reported in Table 20. There was a significant effect of prior or current employment by an entrepreneur on pre-test openness to ideation at the $p \leq .01$ level [$F(1, 375) = 7.567$, $p = .006$]. There was not a significant effect of current personal business ownership on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .015$, $p = .903$].

Table 21 features results from one-way ANOVA analysis of prior or current friends or other family business ownership effect on openness to ideation. There was not a significant effect of prior or current other family or friend business ownership on pre-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = .176$, $p = .675$]. There was not a significant effect of current personal business ownership on post-test openness to ideation at the $p \leq .05$ level [$F(1, 375) = 1.979$, $p = .160$].

Relationship between Demographic Variables and Entrepreneurial Intent

This section reviews the relationship between pre- and post-test entrepreneurial intent and select demographic variables. Tables 22 through 33 feature the relationship between demographic variables and entrepreneurial intent. One-way between subjects ANOVAs were conducted on problem solving profile, gender, ethnicity, age, educational experiences, and business experiences effect on both pre- and post-test entrepreneurial intent.

Problem Solving Profile

One-way between subjects ANOVA results of problem solving profile effect on entrepreneurial intent are reported in Table 22. Demographic results of the problem solving profile are reported in Table 2. Sixteen students did not take the problem solving profile, thus the sample for this variable was 360. Due to sample size limitations, generator and conceptualizer (ideation) were recategorized together and optimizer and implementer (evaluation) were recategorized together. There was a significant effect of problem solving profile on pre-test entrepreneurial intent at the $p \leq .01$ level [$F(1, 359) = 8.761$, $p = .003$]. There was a significant effect of problem solving profile on post-test entrepreneurial intent at the $p \leq .05$ level [$F(1, 359) = 5.478$, $p = .020$].

Gender, Ethnicity, and Age

Tables 23 through 25 feature results of one-way ANOVA analysis of gender, ethnicity, and age effect on entrepreneurial intent. Results for one-way ANOVA analysis of gender effect on entrepreneurial intent are in Table 23. Two of the 376 students reported gender as "other," thus the sample size for the gender variable was 374. There was a significant effect of gender on pre-test entrepreneurial intent at the $p \leq .001$ level [$F(1, 373 = 16.154$, $p \leq .001$]. There was a significant effect of gender on post-test entrepreneurial intent at the $p \leq .001$ level [$F(1, 373 = 20.552$, $p \leq .001$].

Table 24 features results of one-way ANOVA analysis of ethnicity effect on entrepreneurial intent. Due to sample size limitations, ethnicity was recategorized into White and Other. There was not a significant effect of ethnicity on pre-test entrepreneurial intent at the $p \leq .05$ level [$F(1, 375) = 3.781$, $p = .053$]. There was not a significant effect of entrepreneurial

educational experiences on post-test entrepreneurial intent at the p≤.05 level [F(1, 375) = 3.552, p = .060].

Results of one-way ANOVA analysis for age effect on entrepreneurial intent are reported in Table 25. Due to sample size limitations, age was recategorized into 18-25 and other. There was not a significant effect of age on pre-test entrepreneurial intent at the p≤.05 level [F(1, 375) = .1.572, p = .211]. There was not a significant effect of entrepreneurial educational experiences on post-test entrepreneurial intent at the p≤.05 level [F(1, 375) = .143, p = .706].

Educational Experiences

Tables 26 through 28 feature the results of analysis of variance for openness to ideation by educational experiences. Educational experiences demographics of the study participants are reported in Table 3.

Table 26 features one-way ANOVA analysis results of entrepreneurship education effect on openness to ideation. Due to sample size limitations, entrepreneurship educational experiences were recategorized into some entrepreneurship education exposure (yes) and no entrepreneurship education exposure (no) based on enrollment in an academic major, minor, certificate, or extracurricular program in entrepreneurship. There was a significant effect of entrepreneurial educational experiences on pre-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 98.541, p ≤ .001]. There was a significant effect of entrepreneurial educational experiences on post-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 92.541, p ≤ .001].

Results of one-way ANOVA analysis for academic major effect on entrepreneurial intent are reported in Table 27. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic major was recategorized into business school or other. There was not a significant effect of academic major on pre-test entrepreneurial intent

at the p≤.05 level [F(1, 375) = 3.042, p = .082]. There was a significant effect of academic major on post-test entrepreneurial intent at the p≤.01 level [F(1, 375) = 7.278, p = .007].

Table 28 features one-way ANOVA results for academic minor effect on entrepreneurial intent. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic minor was recategorized into business school or other. There was not a significant effect of academic minor on pre-test entrepreneurial intent at the p≤.05 level [F(1, 375) = 1.107, p = .293]. There was a not significant effect of academic minor on post-test entrepreneurial intent at the p≤.05 level [F(1, 375) = 2.188, p = .140].

Entrepreneurship Exposure

This section reviews the relationship between pre- and post-test entrepreneurial intent and exposure to entrepreneurship. Table 16 features results from current and prior exposure to entrepreneurship survey items. Results of one-way between subjects ANOVAs of current personal business ownership, prior personal business ownership, prior or current parent business ownership, prior or current employment by an entrepreneur, and prior or current other family or friend business ownership effect on entrepreneurial intent are reported in Tables 29 through 33.

Table 29 features one-way ANOVA results for current personal business ownership effect on entrepreneurial intent. There was a significant effect of current personal business ownership on pre-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 65.568, p ≤ .001]. There was a significant effect of current personal business ownership on post-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 36.303, p ≤ .001].

One-way ANOVA results for prior personal business ownership effect on entrepreneurial intent are reported in Table 30. There was a significant effect of prior personal business ownership on pre-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 108.587, p ≤ .001].

There was a significant effect of prior personal business ownership on post-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 81.896, p ≤ .001].

Table 31 features one-way ANOVA results for prior or current parent business ownership effect on entrepreneurial intent. There was a significant effect of prior or current parent business ownership on pre-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 11.647, p = .001]. There was a significant effect of prior or current parent business ownership on post-test entrepreneurial intent at the p≤.01 level [F(1, 375) = 9.404, p = .002].

One-way ANOVA results for current or prior employment by an entrepreneur effect on entrepreneurial intent are reported in Table 32. There was a significant effect of prior or current employment by an entrepreneur on pre-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 22.787, p ≤ .001]. There was a significant effect of prior or current employment by an entrepreneur on post-test entrepreneurial intent at the p≤.001 level [F(1, 375) = 24.560, p ≤ .001].

Table 33 features one-way ANOVA results for prior or current friends or other family business ownership effect on entrepreneurial intent. There was a significant effect of prior or current other family or friend business ownership on pre-test entrepreneurial intent at the p≤.01 level [F(1, 375) = 10.054, p = .002]. There was a significant effect of prior or current other family or friend business ownership on post-test entrepreneurial intent at the p≤.01 level [F(1, 375) = 10.149, p = .002].

Summary

Chapter Four provided results from the analysis of pre-and post-test openness to ideation and entrepreneurial intent scores of students who participated in a new venture ideation exercise. Both openness to ideation and entrepreneurial intent significantly increased from pre- to post-test

among those students. The change in openness to ideation and the change in entrepreneurial intent were not significantly correlated.

A summary of demographic variable effect on openness to ideation and entrepreneurial intent is reported in Table 34. Problem solving profile and prior or current employment by an entrepreneur had a significant effect on pre-test openness to ideation. Problem solving profile and entrepreneurship education experiences had a significant effect on post-test openness to ideation.

Problem solving profile, gender, entrepreneurship education experiences, and all five measures of entrepreneurship exposure had a significant effect on pre-test entrepreneurial intent. Problem solving profile, gender, entrepreneurship education experiences, academic major, and all five measures of entrepreneurship exposure had a significant effect on post-test entrepreneurial intent.

CHAPTER FIVE: DISCUSSION, LIMITATIONS, AND CONCLUSION

Project Summary

This study investigated the influence of deliberate practice (Ericsson, 2008) of an experiential learning (Kolb, 2014) exercise in new venture ideation in undergraduate college entrepreneurship courses on student entrepreneurial intent and ideation. The researcher administered a one-week intervention in undergraduate entrepreneurship courses across 10 different sections at three higher education institutions. The researcher, a trained and experienced ideation process facilitator and experienced entrepreneurship educator, trained the students on creativity, ideation, and new venture proposals using experiential exercises, and guided them through individual and team new venture ideation-evaluation processes. Students provided self-report information by completing openness to ideation and entrepreneurial intent instruments via a pre- and post-test survey method (Fowler, 2009).

Krueger's adjusted Entrepreneurial New Venture Feasibility and Desirability Instrument (Krueger, 1993; Krueger & Carsrud, 1993; N. Kruger, personal communication, Oct 26, 2016) was used to measure entrepreneurial intent. Basadur's Ideation-evaluation Instrument (Basadur, 1995; Basadur & Finkbeiner, 1985) was administered to measure openness to ideation. Basadur's Creative Problem-solving Profile (Basadur et al., 1990) was used to measure student problem-solving styles, which was treated as a demographic variable in this study. Age, class rank, ethnicity, gender, entrepreneurship education experiences, academic major, and academic minor were also collected in the pre-test survey instrument.

The 10 class sections researched across three institutions featured enrollment of 556 unique students. Of the 556 students, 376 participated in the entire exercise, as well as both the pre- and post-tests.

This study was quantitative in nature (Gay et al., 2012). Data were analyzed using descriptive and inferential statistics (Coladarci & Cobb, 2014; Creswell, 2014). Inferential statistics used included t-test to measure individual repeated measure growth (Dimitrov & Rumrill, 2003) in openness to ideation and entrepreneurial intent, Pearson correlation (Fitzmaurice et al., 2011) of changes in openness to ideation and entrepreneurial intent, and one-way ANOVA to compare demographic factors between subjects (Belle, 2008). Results are discussed in the sections that follow.

Openness to Ideation after a New Venture Ideation Exercise

The ideation process provides individuals and teams with implementable outcomes to challenging problems. These challenging problems also present opportunities. However, these opportunities can only be leveraged if individuals and teams are willing to put the time and effort into the ideation process, and are willing to actively separate divergent and convergent stages in the process, as well as respect the value and of—and fully engage in—both of those stages. Given the convergent stage is where most people fail to respect the ideation process, openness to ideation is best measured through premature evaluation of ideas and preference for ideation. The training techniques and exercises in this treatment were aimed at quickly assimilating students to the value of ideation, and, in particular, the intersection of divergent and convergent activity. The exercises encouraged open sharing of ideas, discouraged "bad" idea shaming, aided in surfacing and examining examples of instances where individuals did not share ideas, and demonstrated the potential results of open group divergence.

This research question sought to examine whether a brief intervention including approximately 75 minutes of practice with abstract divergent exercises and 75 minutes of applied practice of the ideation process through individual and team new venture ideation could impact

openness to ideation in students. Specifically, the researcher hypothesized that openness to ideation would significantly increase after the treatment. As hypothesized, openness to ideation significantly increased ($p \leq .001$) from pre- to post-test after the 150-minute intervention.

These results support Runco's (2004) claim that creativity is a key talent of contemporary culture, and that everyone has the ability to be creative and play a part in the ideation process (Chegeni et al., 2016). They are also consistent with Basadur's (2003) findings, where experiential learning (Kolb, 2014) and deliberate practice (Ericsson, 2008) of the ideation process leads to increased comfort with open exercise and expression of creativity and divergent activity.

The establishment of trust and understanding in these exercises encouraged openness to ideation and open participation (Gemmel et al., 2012). Eliminating—or greatly reducing—social pressures surrounding idea generation also aided in increased adoption and participation in these exercises (Rhodes, 1961; Runco, 2004; Sternberg, 2006; Sternberg & Lubart, 1991, 1995). Collective cognition (Kristensson & Magnusson, 2010), group idea flow (Csikszentmihalyi, 1996), and distributed group creativity (Sawyer & DeZutter, 2009) also likely took the pressure off individual participants, as they realized they did not have to conceive the entire solution set themselves.

While research in other disciplines has intimated higher education can enhance creativity with training (White et al., 2012), what is unique about the findings in this study is how a deliberate and compact set of exercises had such a profound impact on openness to ideation. Students reported a noticeable increase in their openness to ideation after just 75 minutes of simple divergent exercises and training and 75 minutes of applied practice of these skills in a new venture ideation exercise. Further, these results are unique in that they measure changes in

student openness to ideation in the context of entrepreneurial activity, skills, and behaviors in the academic environment.

Entrepreneurial Intent after a New Venture Ideation Exercise

While entrepreneurship courses and programs may be attractive options for students in today's higher education landscape, enrollment in these courses or programs certainly does not guarantee students will behave entrepreneurially—let alone become entrepreneurs—after completion. Measuring entrepreneurial intentions before and after ideation training and a new venture ideation exercise provides evidence as to the effectiveness (Krueger et al., 2000) of short, yet focused practice sessions such as the intervention in this study.

This intervention aimed at primarily focusing on and practicing three entrepreneurial skills (problem solving, opportunity recognition, and ideation) to conceive and develop both individual and group new venture ideas. There were virtually no rules (such as for-profit versus non-profit venture idea distinctions), as to encourage the free flow of ideas and solutions to problems the students were aware of or had encountered in their own lives. During this short exercise (approximately 75 minutes), students were asked to come up with 10 of their own ideas, converge down to their top three ideas, join a group of four students to combine for approximately 12 group ideas, and mesh and improve their ideas into one final group idea.

The intent of this research question was to examine whether a brief intervention including approximately 75 minutes of practice with abstract divergent exercises and 75 minutes of applied practice of the ideation process through individual and team new venture ideation could impact entrepreneurial intent in students. Specifically, the researcher hypothesized entrepreneurial intent would significantly increase after the treatment. As hypothesized, openness to ideation significantly increased ($p \leq .001$) from pre- to post-test after the 150-minute intervention.

These results are well-positioned in the context of existing literature. It has been well-established in the academy that entrepreneurs can be developed, even made (e.g., Sanchez, 2013; Schenkel et al., 2014), and that entrepreneurship is a discipline that can be learned (Morris, 2016). Despite these strong assertions, the effectiveness of entrepreneurship education to actually develop students as entrepreneurs is still very much in question (Fretschner & Weber, 2013; Rideout & Gray, 2013).

While the extant literature has effectively explored static entrepreneurial intentions scores of students with little or no regard for measuring improvement, as well as addressed what explains entrepreneurial intentions, such as planned behavior and efficacy (e.g., Engle et al., 2010; Fretschner & Weber, 2013; Kautonen, van Gelderan, & Fink, 2013; Sanchez, 2013; Yang, 2013), higher education's actual impact on entrepreneurial intentions has largely gone unexplained (Thompson, 2009). Some scholars have asserted intent increases with education (Le Poutre, Van Den Berghe, Tilleuil, & Crijns, 2010; Peterman & Kennedy, 2003; Schenkel et al., 2014), while others concluded that intent decreases over the course of the educational experience (Oosterbeek, van Praag, & Ijsselstein, 2010; Sanna, Anmari, Elina, & Erno, 2013). This raises the question of what defines an effective entrepreneurship education curriculum or program, and further points to the lack of clear measurements (Thompson, 2009) and empirical support (Naia, Baptisa, Januario, & Trigo, 2015) for the effectiveness of entrepreneurship education.

Given the positive results of entrepreneurship exposure effect on entrepreneurial intent discussed below, it is not surprising that experiential learning (Kolb, 2014) and deliberate practice (Ericsson, 2008) of the new venture ideation process led to increased entrepreneurial intentions. This is particularly salient given the high importance of entrepreneurial self-efficacy in the adjusted Entrepreneurial New Venture Feasibility and Desirability Instrument (Krueger,

1993; Krueger & Carsrud, 1993; N. Kruger, personal communication, Oct 26, 2016). As mentioned above relative to collective cognition and ideation efficacy, students likely enjoyed the increased efficiency, speed, and noticeable effectiveness of the process, and how it relieved some of the traditional pressures to provide solutions in isolation (Dowell et al., 2014; Eckstein et al., 2012; West, 2007).

One of the main barriers to intent and ensuing entrepreneurial behavior among current and recent college students is a lack of self-efficacy in the key cognitive talents needed to be a successful entrepreneur (Chen et al., 1998). Given ideation is one of those skills (Ames & Runco, 2005; Basadur & Goldsby, 2016)—and greater openness to ideation was realized as a result of this treatment—it is far from a faithless leap to assume practice of new venture ideation skills can lead to increased entrepreneurial intentions. The exercises in this study also aimed at increasing student experiences in entrepreneurial mindset (Kuratko, 2016a; Schenkel et al., 2014; Solesvik, et al., 2013), orientation (Frese & Gielnik, 2014; Schenkel et al., 2014), alertness (Brockman, 2014; Tang et al., 2012), and opportunity recognition (Ardichvili et al., 2003; Sanchez, 2013; Segal, Borgia, & Schoenfeld, 2005; Wood, McKinley, & Engstrom, 2013; Zhang et al., 2015), all of which are recognized as key skills that drive entrepreneurial self-efficacy. Gird and Bagraim (2008) found entrepreneurial self-efficacy can increase with even the slightest of enhancements to experience, which supports the ability of these exercises to have a highly significant impact on entrepreneurial intent despite the nature of their brevity.

This study confirmed that exposing students to a simple ideation process that begins to transform societal problems into valuable solutions (Basadur & Goldsby, 2016; Runco & Basadur, 1993) will improve self-efficacy to drive heightened entrepreneurial intent. Given scholarly assertions that entrepreneurship education still lacks development of key

entrepreneurial skills (Chen et al., 1998; Corbett, 2005), it is clear students are getting off on the wrong foot in their educational path if they are being forced to create new venture ideas while lacking the critical ideation skills and orientation towards ideation and entrepreneurial opportunity. Despite intent being the best measure to date for determining the impact of entrepreneurship education (Bae et al., 2014), programs are not measuring—or at least publishing—changes in intent likely because they do not want to be held captive to the results.

While select studies have examined the effect of a series of workshops (Pruett, 2012) and summer programs (Potishuk & Kratzen, 2017) on entrepreneurial intentions, the findings of this study are uniquely situated in the literature because they explain how a deliberate and compact set of exercises had such a profound impact on entrepreneurial intent. Students reported a highly significant increase in entrepreneurial intent after just 75 minutes of simple divergent exercises and training and 75 minutes of applied practice of these skills in a new venture ideation exercise.

Correlation between the Change in Openness to Ideation and the Change in Entrepreneurial Intent after a New Venture Ideation Exercise

This research question was aimed at connecting openness to ideation and entrepreneurial intent. The researcher hypothesized that a change in openness to ideation would be significantly correlated to a change in entrepreneurial intent.

While results approached significance ($p=.051$), Pearson correlation analysis results failed to support the hypothesis. In this study, students were afforded a supportive environment, but perhaps not enough coaching on their individual and team new venture ideas to help them fully understand and internalize the connection between ideation and entrepreneurial behavior. This might explain the significant positive movement in both entrepreneurial intent and openness to ideation, but the lack of definitive correlation between the two. Given full creative potential

cannot be realized without a positive attitude toward divergent activity (Runco & Acar, 2012), the connection between ideation and entrepreneurial behavior certainly deserves more attention in the literature.

While scholars seem to agree creativity (Hamidi, Wennberg, & Berglund, 2008) and ideation (Ames & Runco, 2005) are key talents in entrepreneurship, entrepreneurial behavior, and the entrepreneurial process, this seemingly obvious link between openness to the ideation process and entrepreneurial intent has not been studied in the academy. Runco and Basadur (1993) even defined ideation as the process that transforms ideas into valuable solutions. Ideation and problem-solving are at the heart of entrepreneurial behavior, as those processes find, solve, and deliver on market-based problems and opportunities to deliver utility (Basadur & Goldsby, 2016). The very nature of the ideation process aligns with the assertion of Assundai and Kilbourne (2015) that entrepreneurship should be taught with a social constructivist perspective using appreciative inquiry, where students make meaning of the world around them by solving problems and challenges known to them. Where ideation and entrepreneurial intentions collide is in the need for entrepreneurial alertness, mindset (e.g., Schenkel et al., 2014), and orientation (Lumpkin & Dees, 1996). The more open the brain is to the ideation process—the more it becomes a skillset—the more effective a person and groups of people become in creating entrepreneurial solutions. This demonstration of fluid intelligence (Nusbaum & Silvia, 2011) among individuals and team members in the creative process is critical to entrepreneurial success, as entrepreneurial endeavors cannot be completely predicted. Despite the implicit connection between creativity and entrepreneurship, the minimal evidence of high creativity scores among successful entrepreneurs who were former entrepreneurship students includes just one empirical study (Shrader & Finkle, 2015).

Further, the assertion that Chen et al. (1998) made regarding the failure of entrepreneurship education to drive entrepreneurial self-efficacy in innovation and risk-taking, two key outputs of ideation and skills of entrepreneurs, still holds true today (Sanchez, 2013). While entrepreneurship education may develop managerial and interpersonal skills, researchers have found programs largely have not fostered creative talents in students (Elmuti, Khoury, & Omran, 2012). Chen et al. posited this low entrepreneurial self-efficacy present among higher education entrepreneurship students is driven by a lack of supportive environment and coaching. Lautenschlager and Haase (2011) went so far as to argue entrepreneurship programs should not even be teaching business creation because they fail to invest in student soft skills, such as creativity, opportunity recognition, and problem solving. Given creativity is viewed as a key talent in entrepreneurship, and creativity scores are a key predictor of success among precocious (top 1%) youth (Wai, Lubinski, & Benbow, 2005), these findings warrant more attention to the link between creativity, ideation, entrepreneurship education, and impactful practice of entrepreneurial behavior among former students of entrepreneurship programming.

Demographic Variables Influence on Openness to Ideation

This research question examined the effect of demographic variables (problem solving profile, gender, ethnicity, age, educational experiences, and entrepreneurship exposure) on pre- and post-test openness to ideation. It was hypothesized that demographic variables had a significant effect on pre-test openness to ideation, but no additional effect on post-test openness to ideation. As mentioned above, overall these results support Runco's (2004) claim that everyone has the ability to be creative and play a part in the ideation process (Chegeni et al., 2016). Discussion of the specific results below for each demographic variable relies heavily on

literature surrounding demographic variable effect on creativity, as ideation generally has not been linked to such variables in the literature.

Problem Solving Profile

As expected, problem-solving profile had a significant effect on both pre- (p=.048) and post-test (p=.022) openness to ideation, though a more significant effect on post-test openness to ideation. Given the Basadur Problem solving Profile (Basadur, Gelade, Basadur et al., 2016) measures ideation versus evaluation preferences in one of its two subscales, one would expect that problem solving profile—particularly when recategorized to generator/ conceptualizer (ideation) and optimizer/ implementer (evaluation)—would have a significant effect on openness to ideation. When exposed to ideation exercises, problem solving style effect on openness to ideation did increase from pre- to post-test, and although not hypothesized, these results support the assertion that training and practice in ideation improves openness to the creative process (White et al., 2012).

Gender, Ethnicity, and Age

Gender did not have a significant effect on pre- (p=.751) or post-test (p=.262) openness to ideation. These results are consistent with what other scholars have found regarding gender differences in creativity and divergent behavior scores and ability (Abraham, Thybusch, Pieritz, & Hermann, 2014; Baer & Kaufman, 2008; Kaufman, 2006; Reese, Cowen, & Puckett, 2001). Ethnicity did not have a significant effect on pre- (p=.517) or post-test (p=.829) openness to ideation. Again, these findings are in line with the extant literature (Kaufman, 2006). Finally, age did not have a significant effect on pre- (p=.452) or post-test (p=.515) openness to ideation. These findings are also consistent with the findings of other researchers (Ng & Feldman, 2008; Reese et al., 2001), and support the assertions of Jones and Weinberg (2011) that creative ability

does not differ by age, even though the productive output of that creativity may decrease with age. Collectively, these findings further support the position that everyone has the ability to be creative, and all students should be given the opportunity to exercise that creativity.

Educational Experiences

Exposure to entrepreneurship education (enrollment in certificate, minor, major, or extracurricular program) did not have a significant effect on a pre-test openness to ideation ($p=.142$). However, exposure to entrepreneurship education had a significant effect on post-test openness to ideation ($p=.049$). These results infer that after students enrolled in entrepreneurship programs were exposed to and given the opportunity to practice active divergence and new venture ideation, there was a difference in their openness to ideation compared to other students. This finding is a new contribution to the field, and stresses the importance of exercising and practicing the key skills of creativity, active divergence, and ideation in entrepreneurship education programs.

Academic major did not have a significant impact on pre- ($p=.967$) or post-test ($p=.168$) openness to ideation. Academic minor also did not have a significant impact on pre- ($p=.079$) or post-test ($p=.265$) openness to ideation. These findings are consistent with the limited existing literature, where researchers failed to find significant differences in creative ability among students enrolled in different academic disciplines (e.g., Berglund & Wennberg, 2006).

Entrepreneurship Exposure

Of the five exposure to entrepreneurship survey items (i.e., current personal business ownership, prior personal business ownership, prior or current parent business ownership, prior or current employment by an entrepreneur, and prior or current friends or other family business ownership), only prior or current employment by an entrepreneur had a significant effect on pre-

test openness to ideation (p=.006). This result appears to be an outlier, and requires deeper analysis and study to make meaning of it. This connection has not been addressed in the extant literature.

Demographic Variables Influence on Entrepreneurial Intent

This research question examined the effect of demographic variables (problem solving profile, gender, ethnicity, age, educational experiences, and entrepreneurship exposure) on pre- and post-test entrepreneurial intent. It was hypothesized that demographic variables had a significant effect on both pre- and post-test openness to ideation. Results are discussed in this section.

As mentioned above in the discussion of the change in entrepreneurial intent results, entrepreneurs can be made or developed (Sanchez, 2014; Schenkel et al., 2014) and entrepreneurship is a behavior and process that can be learned (Morris, 2016). In addition, entrepreneurial self-efficacy, a key driver of entrepreneurial intent, can be increased with practice and enhanced experience (Gird & Bagraim, 2008). This evidence insinuates that entrepreneurial behavior is largely not limited by age, ethnicity, or other demographic factors.

Problem Solving Profile

As hypothesized, problem solving profile had a significant effect on pre- (p=.003) and post-test (p=.020) entrepreneurial intent. Specifically, generators and conceptualizers had significantly higher pre- and post-test entrepreneurial intent scores than their optimizer and implementer counterparts. However, entrepreneurial intent increased in conceptualizers, optimizers, and implementers at a much higher rate than it did in generators from pre- to post-test. While this is consistent with the literature in terms of ideation skills and orientation being a key component of entrepreneurship (Ames & Runco, 2005), the academy has not studied

problem solving styles as they relate to entrepreneurship despite Basadur and Goldsby's (2016) assertion that problem solving style is a key factor in entrepreneurship. Others have found proactive personality (Travis & Freeman, 2017), a trait found in implementers (Basadur, Gelade, Basadur et al., 2016) coupled with entrepreneurial self-efficacy equates to strong entrepreneurial intentions. While current entrepreneurship education seems to favor action-oriented individuals, more attention needs to be given to those who are creative and strategically-oriented, such as generators and conceptualizes. Given the Basadur Problem-solving Profile measures ideation versus evaluation preferences in one of its two subscales, it does, however, further lend curiosity to the relationship between change in openness to ideation and change in entrepreneurial intent.

Gender, Ethnicity, and Age

Gender had a significant effect on pre- ($p \leq .001$) and post-test ($p \leq .001$) entrepreneurial intent. Diaz-Garcia and Jimenez-Moreno (2010) and Sanna et al. (2013) found initial gender effect on intentions and how those intentions develop over time, while others found no gender effect on entrepreneurial intentions (Oosterbeek et al., 2010; Pruett, 2012). Further, Smith, Sardeshmukh, and Combs (2016) found females with higher creativity scores also have higher entrepreneurial intentions. Wilson, Kickul, and Marlino (2007) also asserted that entrepreneurship education is more important for women than men in increasing entrepreneurial self-efficacy. Based on the limited availability of research in this space, more study is necessary to gain a better understanding of the differences between males and females in entrepreneurship education. However, it is clear that entrepreneurship instructors ought to have a sense of urgency, commitment, and intentionality to provide programming, exercises, and training that are female-friendly.

Ethnicity did not have a significant effect on pre- (p=.053) or post-test (p=.060) entrepreneurial intent. This is consistent with the surprisingly limited and inconclusive literature that has addressed cultural differences in entrepreneurial intent (Basu & Virick, 2008), though researchers have stressed the importance and value of developing culturally diverse entrepreneurship programs (Mehta, Yoon, Kulkarni, and Finch, 2016). Finally, age did not have a significant effect on pre- (p=.211) or post-test (p=.706) entrepreneurial intent. Age moderation on entrepreneurial intentions has not been addressed in the academy.

Educational Experiences

As expected, exposure to entrepreneurship education (enrollment in certificate, minor, major, or extracurricular program) had a highly significant effect on a pre- ($p \leq .001$) and post-test ($p \leq .001$) entrepreneurial intent. While entrepreneurship students have higher intentions toward entrepreneurship (Solesvik, 2013), entrepreneurship education has not necessarily shown to increase intent (Fretschner & Weber, 2013). Though the impact of entrepreneurship education is still debated, educators can point to Gird and Bagraim's (2008) assertion, that practicing skills alone will improve entrepreneurial self-efficacy, to infer that experience—though quality and depth can be debated—affirms at least some level of effectiveness of entrepreneurship education.

Academic major did not have a significant impact on pre-test entrepreneurial intent (p=.082), but did have a significant effect on post-test (p=.007) entrepreneurial intent. Academic minor did not have a significant impact on pre- (p=.293) or post-test (p=.140) entrepreneurial intent. Though not confirming pre-test hypotheses, these results are consistent with entrepreneurship not being business-centric, but rather a collection of talents and skills (Badal & Struer, 2014; Davis, Hall, & Mayer, 2015; Hayes & Richmond, 2017). This is a key finding of

the study, as it further highlights the need to encourage the involvement of students of all academic backgrounds in entrepreneurship academic and extracurricular programming.

Entrepreneurship Exposure

As hypothesized, all five of the exposure to entrepreneurship survey items (current personal business ownership, prior personal business ownership, prior or current parent business ownership, prior or current employment by an entrepreneur, and prior or current friends or other family business ownership) had a highly significant effect on entrepreneurial intent. These findings are consistent with those of other scholars (e.g., Engle et al., 2010; Fretschner & Weber, 2013; Kautonen, van Gelderan, & Fink, 2013; Sanchez, 2013; Yang, 2013). They also point to Csikszentmihalyi's (1996) assertion that reduction of domain barriers and access to the field are critical components of mobilizing one's creative solutions to market place challenges. Once again, these findings stress the importance of providing students with experiences that will enhance their entrepreneurial efficacy, and thus, orient them toward entrepreneurial behavior.

Limitations

Demographics

The participant demographics for the study are definitely skewed heavily towards Midwestern and rural traditional-age (18-25) college students. Of the 376 participants, 58.8% were males, 75.3% were White, and 91.0% were age 18-25. In addition, 44.7% were senior academic status, 62.2% were business majors, and 43.9% were enrolled in some type of entrepreneurship curriculum. A more diverse data set in terms of demographics would have provided a better representation of the population. In particular, ethnic diversity was largely lacking in this study, which made examining results among specific ethnic groups not realistic. In addition, underclass students (freshmen and sophomores) are underrepresented, as are students

with academic majors outside of business schools. Given anyone can be involved in or lead the ideation process and be entrepreneurial, having data from more students outside of the business schools would have been ideal.

A portion of the skewed demographics can be attributed to lighter than expected participation from students at Institutions B and C, as both schools are in metropolitan areas. The number of course sections and participants at each of those institutions ended up being significantly less than what was anticipated by key contacts and course instructors. In addition, participating faculty members may not have communicated the exercises and pre- and post-tests very effectively. Finally, the professors involved likely did not have very strict attendance policies, as the combined participation rate for the two universities was only 47.3%.

Duration of the Intervention and Data Collection

The short duration (one week of class time, or approximately 150 minutes per course section) of the exercise had both its advantages and disadvantages. The compact nature of the intervention and data collection greatly reduced outside factor influence and the need for a control group. If one were to measure the effect of an entire course on ideation and entrepreneurial tendencies for a semester, other inputs could greatly impact and inflate the results.

Conversely, the short duration does leave some questions unanswered. Would deeper student coaching on new venture ideation have a more profound impact on both quality and quantity? If this exercise was repeated and/ or built upon, would the same impact be realized over and over again, or would instructors begin to see diminishing returns? In other words, would deliberate and intentional practice of these skills lead to—or at least approach—expert

status? Would students better understand the link between ideation skills and new venture creation with more coaching, teaching, and in-depth training?

Data and Instruments

This study relied solely on self-report data collection. It is likely some students merely went through the motions during the exercises and/ or the survey items. This is expected, but difficult to gauge. The researcher is a seasoned facilitator, and his professional perception was that engagement was high during the exercises and students generally took the necessary time to complete the surveys; thus, it appears this limitation had no greater impact on this study than most other similar studies.

Students likely could have given biased responses to the survey items if they assumed the researcher was hoping for increased level of openness to ideation and entrepreneurial intent from pre- to post-test. This limitation was likely minimized by the quality of the instruments, which are well tested in the literature.

Finally, while the adapted version of Krueger's (N. Krueger, personal communication, October 26, 2016) original Entrepreneurial New Venture Feasibility and Desirability Instrument (Kruger, 1993; Krueger & Carsrud, 1993) is highly respected in the field and in the literature, the direct entrepreneurial intent questions (see Table 7) feature a cumbersome 0-100 reporting scale. The researcher is assuming the students found this more challenging to respond to than a simple 1-10 scale or a standard Likert scale. It also created challenges in normalizing the data when correlating the results to the 1-8 scale used for the openness to ideation instrument.

Future Studies

As mentioned above in the limitations, a follow-up study in which the researcher was intentional about involving a more diverse participant base would be very helpful in better

understanding how entrepreneurship education impacts female, minority, and non-traditional student populations. In particular, further research on female entrepreneurial intent in light of the quality and depth of educational programming they are exposed to—in addition to other demographic and experience factors—could provide critical insights towards creating more rewarding and impactful entrepreneurship education experiences for women.

Krueger's adapted version (N. Krueger, personal communication, October 26, 2016) of the original Entrepreneurial New Venture Feasibility and Desirability Instrument (Kruger, 1993; Krueger & Carsrud, 1993) is very robust. While this study singled out the entrepreneurial intent questions, other subscales in the instrument include entrepreneurial self-efficacy, role identity, perceived desirability, perceived behavioral control, perceived feasibility, social norms, and personal attitude towards act. Entrepreneurial self-efficacy measures are particularly salient in the entrepreneurial intent models. While scholars agree these measures are excellent predictors of entrepreneurial intent, some subscale factors could better explain the relationship between ideation and entrepreneurial behavior, especially if analyzed in the context of individual and team ideation self-efficacy.

As discussed above and based on the results, it is clear the correlation between changes in openness to ideation and changes in entrepreneurial intent need further investigation. While influential scholars in the space agree the two are linked, it would be advantageous to supplement the indirect evidence with empirical evidence supporting the relationship between the variables. Given ideation is viewed as a key skill set in entrepreneurship, problem solving is at the heart of ideation, and problem solving is positioned as being the very essence entrepreneurship, further study of the correlation between entrepreneurship and problem solving

styles should prove to be very insightful into the relationship between ideation, skill building, problem solving, team building, and entrepreneurial intentions.

A logical next step for this type of research is to collect data on and examine group dynamics, process, and output quality. These variables include the degree to which students met the prescribed requirements, the quality of individual and group ideas, group demographics and cognitive diversity, and group satisfaction.

There is a marked focus on the individual in entrepreneurship education. Further examining collective cognition, ideation, and team skill and talent composition could greatly enhance both educational experiences as well as higher education outputs, such as venture start-ups, marketable technologies, solutions to complex societal challenges, improved problem-solving and critical thinking skills, and improved workforce preparation. An additional next logical step would be to measure the effect of repeated short interventions and the cumulative effect of the collection of those interventions longitudinally.

Both instruments used in this study need to be modified or augmented to better measure contemporary entrepreneurship issues. First, the openness to ideation scale needs to be augmented with questions pertaining to ideation self-efficacy, social norms, prior exposure to ideation, perceived behavior control, and perceived feasibility.

As mentioned in the limitations section, the ambiguous and cumbersome 0-100 scales in the entrepreneurial intent instrument need modified. Further—and most importantly—the entrepreneurial intent instrument needs to be modified to better reflect one's desire, ability, and propensity to behave entrepreneurially. The current instrument focuses solely on intent to start a for-profit business. While start-up entrepreneurs are critical to cultural and economic advancement, they are far from the only individuals involved in innovation and entrepreneurial

endeavors, whether large or small. Finally, this adapted measure of entrepreneurial behavior intentions could reduce pressure on educators who are reluctant to assess and report their educational impact based on current entrepreneurial intentions study due to a lack of student efficacy in starting a business. It is particularly unrealistic to judge entrepreneurship educators on whether or not their students intend to start business or not, let alone if they actually start businesses out of college. Students are typically lacking the experience, networks, and strong industry connections or access necessary to start a venture just out of college anyway.

An entrepreneurial behavior intent and tendencies instrument would provide educators with a much better tool towards improved coaching, training, and teaching entrepreneurial behavior and skills. Paired with entrepreneurial talents assessments, such as the Builder Profile-10 (Badal & Struer, 2014) and the Entrepreneurial Mindset Profile (Davis, Hall, & Mayer, 2015), it could also be an excellent tool to assist entrepreneurs, corporate leaders, education institutions, and non-profit organizations in building effective entrepreneurial, innovation, project, and change management teams. The thought of being a solo entrepreneur is daunting for most students, particularly ones who chose an entrepreneurship education track because it sounded fun or was popular at their institution. Given productive creativity and innovation typically happens best in community, it could take a great deal of pressure off these students to realize they do not have to conceive all solutions to challenges, problems, and opportunities, nor do they have to possess all of the talents necessary to undertake entrepreneurial endeavors, and enjoy success in those undertakings.

Implications

Study Overview and Key Findings

The key findings of this study centered on the effectiveness of a brief, yet intentional, set of divergent activities and new venture ideation exercises in significantly increasing openness to ideation and entrepreneurial intent in students enrolled in undergraduate entrepreneurship courses. While results did not support a significant correlation between the change in openness to ideation and a change in entrepreneurial intent, it is clear this connection warrants further study. Other key findings included the following:

1) Problem solving style effect on pre- and post-test openness to ideation and entrepreneurial intent was significant.
2) Effect on post-test openness to ideation was significant in students enrolled in entrepreneurship academic or extracurricular programming.
3) After students enrolled in entrepreneurship programs were exposed to and given the opportunity to practice active divergence and new venture ideation, there was a difference in their openness to ideation compared to other students.
4) Gender effect on pre- and post-test entrepreneurial intent was highly significant.
5) Entrepreneurship education effect on pre- and post-test entrepreneurial intent was highly significant.
6) Academic major effect on post-test entrepreneurial intent was significant, and
7) Exposure to entrepreneurship effect on pre- and post-test entrepreneurial intent was highly significant.

These results stress the importance of entrepreneurial skill self-efficacy in entrepreneurship education and training.

This study's unique positioning in the literature is that it examined the effect of an intentional, yet brief, set of exercises on openness to ideation and entrepreneurial intent in college students. It measured the change in openness to ideation—something that has not been reported at the undergraduate level in the existing literature. It also measured the change in entrepreneurial intent among students, which has been very scarcely reported by scholars. This is especially true relative to the brevity of the intervention. The study offered exploratory research on the link between problem solving styles and entrepreneurial intent, and the correlation between openness to ideation and entrepreneurial intentions. The impact of exposure to entrepreneurship on entrepreneurial intent should emphatically remind educators of the need to provide students with extensive and immersive opportunities to experience entrepreneurship. Finally, this body of research further stressed the importance of and need for much better engagement of females in entrepreneurship education.

Key Implications

While this study cannot completely inform the practice of entrepreneurship training, noteworthy implications exist for entrepreneurship education administrators, educators, career centers, external partners, and practitioner mentors and coaches. Key implications of this study include:

- Highlights the failure of entrepreneurship education to develop key entrepreneurial skills, specifically those related to creativity and ideation.
- Brings to the surface the lack of reporting on program effectiveness in the literature.
- Emphasizes the need for cross-campus entrepreneurship programming.
- Confirms that educators can advance openness to ideation and entrepreneurial intent.
- Discovers the need to better serve aspiring female students in entrepreneurship.

Based on the findings of this study, it appears entrepreneurship educators are failing to develop some of the most important skills and efficacy in entrepreneurship, such as creativity, ideation, and team building in an effort to fill talent deficiencies of individual students. In particular, it is clear most programs are not developing creativity skills in students nearly enough to drive self-efficacy in the ideation processes. Given the importance most scholars have placed on creativity in the entrepreneurship space, it is baffling so little attention has been afforded to examining the connection between ideation and entrepreneurial behavior in the literature beyond mere assumptions and conjecture.

Further, based on the available literature, it seems as if—particularly among American educators and institutions—the field has been hesitant to report the effectiveness of their programs via pre- and post-test metrics. This raises many questions, but the overarching question is simply, why? Are programs collecting the data and opting not to share? Do programs that have collected the data lack researchers who have an interest in reporting program effectiveness data? Are programs hiding something? Are they not collecting data towards program evaluation? As these questions remain unanswered, the credibility of the academic field of entrepreneurship hangs in the balance.

The findings of this study further confirm the importance of cross-campus entrepreneurship programs that combine students with varying talents, cognitive processes, and perspectives, and openness to more flexible offerings to accommodate students across campus, such as certificate and extracurricular programming. Creativity, ideation, and successful entrepreneurial endeavors flourish when a diverse group of individuals come together to solve a problem or leverage an opportunity, thus educators need to further examine ways to break down boundaries to cross campus entrepreneurial engagement.

In addition, it is clear entrepreneurship education can aid in the advancement of efficacy on ideation behaviors and entrepreneurial intent. This can be achieved through real-world problem investigation and solution development, where students gain practical experience while working on tangible societal issues instead of case studies and ill-conceived venture ideas born in a classroom. The simple and brief exercises in abstract divergent behavior and new venture ideation performed in this study had a profound impact on student openness to ideation and entrepreneurial intent. While it is unknown if ongoing activities similar to these exercises would realize increasing or diminishing returns, it is safe to assume that even briefly practicing (perhaps as little as 5-10 minutes per class session) creativity, ideation, and problem solving would only improve student skills and efficacy.

Finally, it is evident entrepreneurship educators are missing the mark when it comes to female students. Though it is not yet clear what exactly is contributing to lower entrepreneurial intent and self-efficacy among female students, it is not due to a lack of creativity, ideation efficacy, and overall talent among that student group. Entrepreneurship educators have the opportunity to be at the forefront of finding ways to better engage and include female students, and thus providing more opportunities for them to grow their efficacy and grow and use their talents while in school and beyond in the professional world.

Conclusions

The stance that entrepreneurs are made should come with extreme caution and a caveat. In reality, entrepreneurial talents can be fostered and developed. Students should be made aware of their individual talents and deficiencies, and provided with coaching, teaching, and mentoring that encourages them to grow raw talents. They should also know the strengths of their classmates, and be coached on the power of building cognitively diverse teams that use the

individual member talents to deliver on the body of skills necessary to engage in and deliver successful entrepreneurial endeavors. Experience, efficacy, and skill development are at the heart of developing an entrepreneurial student who has potential. Students should be encouraged to augment the talents they lack that are needed for successful entrepreneurial ventures with a combination of practice and effective building of teams. Educators also ought to invest in students by heightening the talents they already possess in raw form through deliberate practice.

Those involved in student teaching, coaching, and mentoring should engage students in exercises and engagements that deliberately practice active divergence and ideation on an ongoing basis. These influencers should be actively encouraging students to practice drawing out their creative skills. It is imperative programs install deliberate practice of problem solving and opportunity exploration into their courses, particularly at the beginning of curriculum tracts. Administrators and instructors should provide opportunities for real-world engagement and experiences by providing internships, projects with internal and external partners, and new venture experimentation. Data on actual businesses created or started should be deemphasized in entrepreneurship education programs, and a heavy emphasis should be placed on process understanding and skill development towards entrepreneurial behavior and efficacy-building of key skills, starting with creativity and ideation. Finally, the importance of building diverse student teams cannot be stressed enough. Educators should develop programs that encourage a broad range of students based on entrepreneurial talents, problem solving style, academic discipline, cognitive approach, and gender and cultural diversity to come together on functional teams working on real societal challenges, problems, and opportunities.

Given the unpredictable nature of entrepreneurial activity and projects, educators should move in a bold direction towards more extracurricular entrepreneurship programming. This

would allow for less formality and academic time and grading constraints, more flexibility with external partners and students across various disciplines, and more contextual and natural pursuit of solutions to societal challenges and opportunities.

The lack of empirical studies evaluating the effectiveness of entrepreneurship programming in higher education is alarming. It is imperative that programs develop clear goals and metrics to evaluate those goals. Perhaps most importantly, researchers need to be bold enough to publish those results—good or bad—to help the field mature and provide the best utility to society. If the discipline is going to grow its influence, effectiveness, and credibility, then program leaders and scholars must be transparent regarding best and worst practices in the domain. Those involved in entrepreneurship education ought to examine and test for the skills and efficacy necessary for successful entrepreneurial endeavors, particularly ideation. Further, they would be well served to reconsider approaches that are slanted towards the individual entrepreneur and new venture start-up activity and results. While those approaches are important, team-based entrepreneurship training and entrepreneurial behavior development will have a far wider-reaching and greater societal impact.

Higher education entrepreneurship curricula and programs are at a critical juncture. The field has experienced unparalleled growth in a very short period of time (roughly three decades), and currently enjoys high popularity levels among students with seemingly reduced levels of scrutiny compared to what it faced 30 years ago. However, while entrepreneurship education has much to offer to its universities, students, and society as a whole, it still faces scrutiny in terms of effectiveness, results, and workforce readiness preparation—both from its peers across campus in higher education and the practitioner world to which it supplies talent. It also faces a great deal of scrutiny as predominately supporting and encouraging for-profit venture start-ups. Given

the broad array of talents among students interested in entrepreneurship, and the potential of entrepreneurial behavior to provide positive solutions to contemporary culture's most compelling challenges, this narrowly focused approach is a disservice to society and the constituents higher education serves.

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APPENDIX A – IDEATION-EVALUATION INSTRUMENT (OPENNESS TO IDEATION)

[Scale: 8-point Likert scale coded (1) Strongly Disagree; (2) Disagree; (3) Moderately Disagree; (4) Slightly Disagree; (5) Slightly Agree; (6) Moderately Agree; (7) Agree; (8) Strongly Agree]

1. I should do some pre-judgment of my ideas before telling them to others.
2. We should cut off ideas when they get ridiculous and get on with it.
3. I feel that people at work ought to be encouraged to share all their ideas, because you never know when a crazy-sounding one might turn out to be the best.
4. One new idea is worth 10 old ones.
5. Quality is a lot more important than quantity in generating ideas.
6. A group must be focused and on track to produce worthwhile ideas.
7. Lots of time can be wasted on wild ideas.
8. I think everyone should say whatever pops into their head whenever possible.
9. I like to listen to other people's crazy ideas since even the wackiest often leads to the best solution.
10. Judgment is necessary during idea generation to ensure that only quality ideas are developed.
11. You need to be able to recognize and eliminate wild ideas during idea generation.
12. I feel that all ideas should be given equal time and listened to with an open mind regardless of how zany they seem to be.
13. The best way to generate new ideas is to listen to others then tailgate or add on.
14. I wish people would think about whether or not an idea is practical before they open their mouths.

APPENDIX B – KRUEGER'S ADJUSTED NEW VENTURE FEASIBILITY AND DESIRABILITY INSTRUMENT (ENTREPRENEURIAL INTENT)

PRIOR EXPOSURE TO ENTREPRENEURSHIP

[Part A: Yes or no; if no, skip logic to next question; if yes, answer part B. Part B: Positive or Negative]

1. A. Do you currently own a business?

   B. Has the experience been positive or negative?

2. A. Did you ever start a business of any kind or were self-employed?

   B. Was the experience positive or negative?

3. A. Did your parent(s) have a business or be self-employed?

   B. Was the experience positive or negative?

4. A. Did you ever work for an entrepreneur?

   B. Was the experience positive or negative?

5. A. Did any other relatives or friends ever start a business?

   B. Was the experience positive or negative?

ENTREPRENEURIAL INTENTION

[Percentage scale 0-100, where 100% = Very Likely]

After your graduation,

a) How likely is it that you will start your own business within the next year?

b) How likely is it that you will start your own business within the next 5 years?

c) How likely is it that you will ever start your own business?

ROLE IDENTITY

[Scale: 0-100 sliding scale for online tools, where 0 = does not describe me, and 100 = completely describes me]

1. I know I am an entrepreneur at heart.
2. I am exactly the kind of person who would be a successful entrepreneur.

PERCEIVED DESIRABILITY

[Scale: 6-point Likert scale coded (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Somewhat Disagree; (5) Disagree; (6) Strongly Disagree]

1. I would rather earn a higher salary employed by someone else than own my own business.
2. I would rather pursue another promising career than own my own business.
3. I am willing to make significant personal sacrifices in order to stay in business.
4. I would work somewhere else only long enough to make another attempt to establish my business
5. I am willing to work more with the same salary in my own business, than as employed in an organization.

PERCEIVED BEHAVIORAL CONTROL

[Scale: 4-point Likert coded (1) Strongly Agree; (2) Somewhat Agree; (3) Somewhat Disagree; (4) Strongly Disagree]

1. For me, having my own business would be very easy
2. If I wanted to, I could easily pursue a career as business owner
3. As a business owner, I would have complete control over the situation

[Scale: 5-point Likert scale, where 1 = very few, 2 = minimal, 3 = several, and 4 = numerous]

4. The events outside my control which could prevent me from having my own business are . . .

[Scale: 6-point Likert coded (1) Very High; (2) High; (3) Somewhat High; (4) Somewhat Low; (5) Low; (6) Very Low]

5. If I start my own business, the chances of success would be very high

6. If I pursue a career as business owner, the chances of failure would be very high

PERCEIVED FEASIBILITY

[Question 1 scale: 0-100, where 100 = very feasible, sliding scale for online tool; Questions 2-6 6-point or 4-point Likert scales]

1. How feasible would it be for you to start your own business? [100 = very feasible]
2. How hard do you think it would be to start your own business? [1 = very hard, 2 = Hard, 3 = Somewhat hard, 4 = Somewhat easy, 5 = Easy, and 7 = Very easy]
3. How certain of success are you if you were to start your own business? [1 = very certain of success, 2 = Certain of success, 3 = Somewhat certain of success, 4 = Somewhat certain of failing, 5 = Certain of failing, and 6 = Very certain of failing]
4. How overworked would you be if you were to start your own business? [1 = Very overworked, 2 = Overworked, 3 = Somewhat overworked, and 4 = Not overworked at all]
5. I know enough to start a business? [1= Strongly Agree, 2 = Agree, 3 = Somewhat Agree, 4 = Somewhat Disagree, 5 = Disagree, 6 = Strongly Disagree]
6. How sure of yourself are you? [1 = Very unsure of myself, 2 = Unsure of myself, 3 = Somewhat unsure of myself, 4 = Somewhat sure of myself, 5 = Sure of myself, and 6 = Very sure of myself]

ENTREPRENEURIAL SELF-EFFICACY

[Scale: 6-point Likert coded (1) Very low confidence; (2) Low confidence; (3) Slightly low confidence; (4) Slightly high confidence; (5) High confidence; (6) Very high confidence]

How much confidence do you have in your ability to . . .

1. Brainstorm (come up with) new ideas?
2. Manage time in projects?

3. Read and interpret financial statements?
4. Set and achieve project goals?
5. Identify opportunities for new ways to conduct activities?
6. Structure tasks in a project?
7. Identify creative ways to get things done with limited resources?
8. Network (i.e., make contact with and exchange information with others?
9. Tolerate unexpected change?
10. Put together the right group/ team in order to solve a specific problem?

[Scale: 6-point Likert coded (1) Worthless; (2) Moderately worthless; (3) Somewhat worthless; (4) Somewhat worthwhile; (5) Moderately worthwhile; (6) Worthwhile]

In general, starting a business is . . .

[Scale: 6-point Likert coded (1) Disappointing; (2) Moderately disappointing; (3) Somewhat disappointing; (4) Somewhat rewarding; (5) Moderately rewarding; (6) Rewarding]

In general, starting a business is . . .

[Scale: 6-point Likert coded (1) Negative; (2) Moderately Negative; (3) Somewhat negative; (4) Somewhat Positive; (5) Moderately positive; (6) Positive]

In general, starting a business is . . .

[Scale: 6-point Likert coded (1) Very low confidence; (2) Low confidence; (3) Slightly low confidence; (4) Slightly high confidence; (5) High confidence; (6) Very high confidence]

How much confidence do you have in your ability to . . .

1. Form partnerships in order to achieve goals?
2. Persist in the face of setbacks?
3. Involve the right people in my projects?

4. Estimate a budget for a new project?
5. Work productively under continuous stress, pressure, and conflict?
6. Establish new contacts?
7. Think outside the box?
8. Control costs for a project?
9. Design an effective plan to achieve goals?
10. Manage uncertainty in projects and processes?
11. Identify ways to combine resources in new ways to achieve goals?
12. Perform financial analysis?
13. Improvise when you do not know what the right action/ decision might be?

GLOBAL PERCEIVED DESIRABILITY ITEM

[Scale: 0-100, where 100 = Very Desirable, sliding scale for online tool]

How desirable would it be to have my own venture?

SOCIAL NORMS

[Scale: 6-point Likert coded (1) Strongly Agree; (2) Agree; (3) Somewhat Agree; (4) Somewhat Disagree; (5) Disagree; (6) Strongly Disagree]

1. My closest family members think that I should pursue a career as an entrepreneur
2. My closest friends think that I should pursue a career as an entrepreneur
3. People that are important to me think that I should pursue a career as an entrepreneur

[Scale: 6-point Likert coded (1) I don't care at all; (2) I don't care; (3) I slightly don't care; (4) I slightly care; (5) I care; (6) I care very much]

4. To what extent do you care about what your closest family members think as you decide on whether or not to pursue a career as an entrepreneur?

5. To what extent do you care about what your closest friends think as you decide on whether or not to pursue a career as an entrepreneur?
6. To what extent do you care about what people important to you think as you decide on whether or not to pursue a career as an entrepreneur?

PERSONAL ATTITUDE TOWARDS ACT

[Scale: 6-point Likert coded (1) Totally Agree; (2) Agree; (3) Somewhat Agree; (4) Somewhat Disagree; (5) Disagree; (6) Totally Disagree]

Indicate your level of agreement with the following sentences:

1. Being an entrepreneur implies more advantages than disadvantages to me
2. A career as entrepreneur is attractive for me
3. If had the opportunity and resources, I'd like to start a firm
4. Being an entrepreneur would entail great satisfaction for me
5. Among various options, I would rather be an entrepreneur

APPENDIX C – DEMOGRAPHICS SURVEY

1. Age [under 18 (if so, survey will be exited); 18-25; 26-30; 31-35; 36-40;41-50; 51-60; 61-70; over 70]
2. Class Rank [freshman; sophomore; junior; senior; graduate student]
3. Ethnicity [White; Hispanic or Latino; Black or African American; Native American; Asian/ Pacific Islander; Other_____; Prefer not to answer]
4. Gender [Male; Female; Other]
5. Academic Major Area (Select all that apply) [Institution A Choices: Applied Sciences and Technology; Architecture and Planning; Miller College of Business; Communication, Information, and Media; Fine Arts; College of Health; Sciences and Humanities; Teachers College; Honors College; Institution C Choices: General Studies; College of Allied Health Professions; College of Arts and Sciences; Mitchell College of Business; College of Education; College of Engineering; College of Nursing; School of Computing; Continuing Education and Special Programs; Honors College; Institution B Choices: Music and Dance; Business; Honors; Biological Sciences, Computing and Engineering; Dentistry; Education; Law; Medicine; Nursing and Health Studies; Pharmacy]
6. Academic Minor Area (Select all that apply) [Institution A Choices: Applied Sciences and Technology; Architecture and Planning; Miller College of Business; Communication, Information, and Media; Fine Arts; College of Health; Sciences and Humanities; Teachers College; Honors College; Institution C Choices: General Studies; College of Allied Health Professions; College of Arts and Sciences; Mitchell College of Business; College of Education; College of Engineering; College of Nursing; School of Computing; Continuing Education and Special Programs; Honors College; Institution B Choices:

Music and Dance; Business; Honors; Biological Sciences, Computing and Engineering; Dentistry; Education; Law; Medicine; Nursing and Health Studies; Pharmacy]

7. Entrepreneurship Education Experience (Select all that apply) [Major; Minor; Certificate; Extracurricular]

APPENDIX D – BASADUR CREATIVE PROBLEM SOLVING PROFILE

[Instructions: Force rank across each row 1, 2, 3, and 4, where 4 = best represents you when problem solving, and 1 = least represents you when problem solving]

1. Alert; Poised; Ready; Eager
2. Patient; Diligent; Forceful; Prepared
3. Doing; Childlike; Observing; Realistic
4. Experiencing; Diversifying; Waiting; Consolidating
5. Reserved; Serious; Fun-loving; Playful
6. Trial & Error; Alternatives; Pondering Evaluating
7. Action; Divergence; Abstract; Convergence
8. Direct; Possibilities; Conceptual; Practicalities
9. Involved; Changing Perspectives; Theoretical; Focusing
10. Quiet; Trustworthy; Responsible; Imaginative
11. Implementing; Visualizing; Describing; Zeroing-in
12. Hands-on; Future-oriented; Reading; Detail-oriented
13. Physical; Creating Options; Mental; Deciding
14. Impersonal; Proud; Hopeful; Fearful
15. Practicing; Transforming; Thinking; Choosing
16. Handling; Speculating; Contemplating; Judging
17. Sympathetic; Pragmatic; Emotional; Procrastinating
18. Contact; Novelizing; Reflection; Making Sure

[Lines 1, 2, 5, 10, 14, and 17 are distractors, and do not count towards the final profile score]

APPENDIX E – TABLES

Table 1

Summary Enrollment and Participation Information for Courses Included in this Research Study

Course Name	Course Description	Enrollment	Participants	Participation Rate %	% of Total Participants
Institution A					
Management 2XX	Introduction to Entrepreneurship	210	188	89.5	50.0
Management 3XX	Marketing for New Ventures	45	22	48.9	5.9
Management 3XX	Venture Leadership	46	29	63.0	7.7
Management 3XX	Product and Service Design	20	17	85.0	4.5
Management 4XX	Entrepreneurial Business Strategy	35	30	85.7	8.0
Institution A Subtotal		356	286	80.3	76.1
Institution B					
Entrepreneurship 2XX	Introduction to Entrepreneurship	35	12	34.3	3.2
Entrepreneurship 4XX	Creating the Enterprise	60	32	53.3	8.5
Entrepreneurship 4XX	Creating the Enterprise	60	26	43.3	6.9
Institution B Subtotal		155	70	45.2	18.6
Institution C					
Management 3XX	Creativity and Innovation	28	12	42.9	3.2
Management 3XX	New Venture Creation	23	8	34.8	2.1
Institution C Subtotal		51	20	39.2	5.3
Total		562	376	66.9	100.0

Table 2

New Venture Ideation Exercise Participant Demographics

Variable	*n*	%
Total Students Participating in the Entire Exercise	376	100.0
Gender		
Male	221	58.8
Female	153	40.7
Other	2	0.5
Institution		
A	286	76.1
B	70	18.6
C	20	5.3
Ethnicity		
White/ Caucasian	283	75.3
Black/ African American	42	11.1
American Indian or Alaska Native	1	0.3
Asian	17	4.5
Other/ Prefer not to Answer	33	10.1
Age		
18-25	342	91.0
25-34	30	8.0
35-44	4	1.0
Problem Solving Profile		
Generator	70	18.6
Conceptualizer	54	14.4
Optimizer	68	18.1
Implementer	168	44.7
Subtotal (Students who took the profile test)	360	100.0
Class Rank		
Freshman	26	6.9
Sophomore	64	1.7
Junior	117	31.1
Senior	168	44.7
Graduate Student	1	0.3

Table 3

New Venture Ideation Exercise Participant Educational Experiences Demographics

Variable	*n*	%
Total Students Participating in the Entire Exercise	376	100.0
Entrepreneurship Major, Minor, or Certificate Program Enrollment		
No	211	56.1
Yes	165	43.9
Major	57	15.2
Minor	98	26.1
Certificate	1	0.0
Extracurricular	9	2.4
Major Field of Study		
Business School	234	62.2
Other	142	37.8
Minor Field of Study		
Business School	179	47.6
Other/ No Minor	197	52.4

Table 4

Percentages for Pre-test Survey Items on Openness to Ideation Instrument

Survey Items	Strongly Disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	Strongly Agree (8)	*M*	*SD*
1) I should do some pre-Judgment of my ideas before telling them to others.	2.7	3.5	2.1	2.9	15.4	15.4	38.0	19.9	6.23	1.68
2) We should cut off ideas when they get ridiculous and get on with it.	4.0	19.7	10.9	18.6	24.2	10.9	10.1	1.6	4.20	1.75
3) I feel that people at work ought to be encouraged to share all their ideas, because you never know when a crazy-sounding one might turn out to be the best.	1.3	0.3	1.1	1.9	6.9	14.9	38.3	35.4	6.88	1.29
4) One new idea is worth 10 old ones.	1.6	6.6	7.4	12.0	31.1	17.0	18.1	6.1	5.18	1.64
5) Quality is a lot more important than quantity in generating ideas.	2.1	3.5	4.3	11.2	13.6	16.5	25.5	23.4	5.99	1.80

continued

Table 4, cont.

Percentages for Pre-test Survey Items on Openness to Ideation Instrument

Survey Items	Strongly Disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	Strongly Agree (8)	*M*	*SD*
6) A group must be focused and on track to produce worthwhile ideas.	0.3	4.8	6.6	10.4	19.9	20.2	25.8	12.0	5.69	1.64
7) Lots of time can be wasted on wild ideas.	2.6	10.4	12.5	17.6	29.5	12.2	12.5	2.7	4.61	1.66
8) I think everyone should say whatever pops into their head whenever possible	6.9	18.6	11.4	17.8	21.5	10.6	9.6	3.5	4.16	1.88
9) I like to listen to other people's crazy ideas since even the wackiest leads to the best solution.	0.8	2.1	3.7	8.8	30.6	23.7	20.7	9.6	5.68	1.42
10) Judgment is necessary during idea generation to ensure that only high quality ideas are developed.	2.4	7.4	6.6	16.8	23.1	17.6	21.0	5.1	5.13	1.72

continued

Table 4, cont.

Percentages for Pre-test Survey Items on Openness to Ideation Instrument

Survey Items	Strongly Disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	Strongly Agree (8)	*M*	*SD*
11) You need to be able to recognize and eliminate wild ideas during idea generation.	2.1	8.8	6.1	15.4	31.4	16.2	15.2	4.8	4.98	1.65
12) We should cut off ideas when they get ridiculous and get on with it.	2.1	3.7	6.1	10.1	21.5	16.0	26.9	13.6	5.68	1.74
13) I feel that all ideas should be given equal time and listened to with an open mind regardless of how zany they seem to be.	0.0	3.2	2.1	7.4	25.8	17.6	31.9	12.0	5.96	1.44
14) I wish people would think about whether or not an idea is practical before they open their mouths.	4.0	14.1	12.5	18.1	25.0	14.4	9.0	2.9	4.40	1.73

Note. Scale was 1 = strongly disagree, 2 = disagree, 3 = moderately disagree, 4 = somewhat disagree, 5 = somewhat agree, 6 = moderately agree, 7 = agree, 8 = strongly agree. Results from questions 1, 2, 5, 6, 7, 10, 11, and 14 were reversed for the analysis, as they are part of the tendency to prematurely judge subscale (actual results are reported in this table).

Table 5

Percentages for Post-test Survey Items on Openness to Ideation Instrument

Survey Items	Strongly Disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	Strongly Agree (8)	*M*	*SD*
1) I should do some pre-Judgment of my ideas before telling them to others.	7.7	17.3	8.5	11.2	21.5	13.8	16.2	3.7	4.47	2.02
2) We should cut off ideas when they get ridiculous and get on with it.	10.9	34.6	11.4	16.2	13.8	5.1	6.6	1.3	3.36	1.80
3) I feel that people at work ought to be encouraged to share all their ideas, because you never know when a crazy-sounding one might turn out to be the best.	0.3	2.1	1.3	1.3	12.8	12.2	37.5	32.4	6.73	1.36
4) One new idea is worth 10 old ones.	2.4	6.1	5.6	14.9	25.5	14.4	21.3	9.8	5.32	1.76
5) Quality is a lot more important than quantity in generating ideas.	3.5	12.0	8.2	16.5	17.8	8.2	21.0	12.8	5.06	2.05

continued

Table 5, cont.

Percentages for Post-test Survey Items on Openness to Ideation Instrument

Survey Items	Strongly Disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	Strongly Agree (8)	*M*	*SD*
6) A group must be focused and on track to produce worthwhile ideas.	1.6	9.6	9.8	11.4	25.3	17.8	19.9	4.5	5.05	1.74
7) Lots of time can be wasted on wild ideas.	2.7	15.4	16.2	22.1	20.5	9.0	12.0	2.1	4.28	1.71
8) I think everyone should say whatever pops into their head whenever possible	3.2	8.8	8.5	16.8	22.1	16.5	17.3	6.9	4.99	1.82
9) I like to listen to other people's crazy ideas since even the wackiest leads to the best solution.	0.3	2.7	2.9	7.4	25.0	18.6	28.7	14.4	5.97	1.47
10) Judgment is necessary during idea generation to ensure that only high quality ideas are developed.	8.8	16.5	9.3	15.2	21.3	13.0	12.0	4.0	4.31	1.98

continued

Table 5, cont.

Percentages for Post-test Survey Items on Openness to Ideation Instrument

Survey Items	Strongly Disagree (1)	(2)	(3)	(4)	(5)	(6)	(7)	Strongly Agree (8)	*M*	*SD*
11) You need to be able to recognize and eliminate wild ideas during idea generation.	5.9	14.6	13.3	16.8	21.5	11.7	13.3	2.9	4.36	1.86
12) We should cut off ideas when they get ridiculous and get on with it.	0.5	2.4	2.7	8.0	22.1	19.7	27.7	17.0	6.03	1.50
13) I feel that all ideas should be given equal time and listened to with an open mind regardless of how zany they seem to be.	0.0	1.3	1.6	5.9	22.1	22.3	28.2	18.6	6.22	1.34
14) I wish people would think about whether or not an idea is practical before they open their mouths.	7.2	24.7	12.2	16.2	19.9	9.6	6.9	3.2	3.89	1.86

Note. Scale was 1 = strongly disagree, 2 = disagree, 3 = moderately disagree, 4 = somewhat disagree, 5 = somewhat agree, 6 = moderately agree, 7 = agree, 8 = strongly agree. Results from questions 1, 2, 5, 6, 7, 10, 11, and 14 were reversed for the analysis, as they are part of the tendency to prematurely judge subscale (actual results are reported in this table).

Table 6

Results of Paired Samples T-test and Descriptive Statistics for Openness to Ideation by Pre- and Post-test

	Pre-test		Post-test			95% CI for Mean Difference			
Outcome	M	SD	M	SD	n		r	t	df
	4.59	.688	5.18	.938	376	[.50, .67]	.001***	14.102	375

Note. CI = confidence interval. *** $p \leq .001$

Table 7

Descriptive Statistics for Entrepreneurial Intent Survey Items

Item	*M*	*SD*
Pre-test		
1) How likely is it that you will start your own business within the next year?	22.62	29.976
2) How likely is it that you will start your own business with the next five years?	44.51	35.526
3) How likely is it that you will ever start your own business?	64.86	35.478
Mean	44.00*	29.988
Post-test		
1) How likely is it that you will start your own business within the next year?	26.89	31.506
2) How likely is it that you will start your own business with the next five years?	48.60	35.394
3) How likely is it that you will ever start your own business?	63.20	36.021
Mean	46.23*	30.383

Note. Scale was 0 = not likely, 100 = highly likely. * Mean scores were used in analysis.

Table 8

Results of T-test and Descriptive Statistics for Entrepreneurial Intent by Pre- and Post-test

	Pre-test		Post-test			95% CI			
Outcome	M	SD	M	SD	n		r	t	df
	44.00	29.99	46.23	30.38	376	[.45, 4.01]	.001***	2.47	375

Note. CI = confidence interval. *** $p \leq .001$.

Table 9

One-way Analysis of Variance for Openness to Ideation by Basadur Problem Solving Profile

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	1.804	1.804	3.934	.048*
Within Groups	358	164.151	0.459		
Total	359	165.955			
Post-test					
Between Groups	1	4.523	0.373	5.292	.022*
Within Groups	358	305.920	0.855		
Total	359	310.443			

Note. Due to a lack of samples across designations, problem solving profiles were collapsed to implementer/ optimizer and generator/ conceptualizer. * $p \leq .05$.

Table 10

One-way Analysis of Variance for Openness to Ideation by Gender

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.0	0.0	0.101	.751
Within Groups	372	176.8	0.5		
Total	373	176.9			
Post-test					
Between Groups	1	1.1	0.4	1.264	.262
Within Groups	372	326.7	0.9		
Total	373	327.8			

Note. Due to the low number (2) of other responses, they were not included in the analysis.

Table 11

One-way Analysis of Variance for Openness to Ideation by Ethnicity

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.2	0.2	0.421	.517
Within Groups	374	177.3	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	0.0	0.0	0.047	.829
Within Groups	374	329.8	0.9		
Total	375	329.8			

Note. Due to a lack of samples across designations, ethnic categories were collapsed to either White/ Caucasian or Other.

Table 12

One-way Analysis of Variance for Openness to Ideation by Age

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.3	0.3	0.567	.452
Within Groups	374	177.2	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	0.4	0.4	0.424	.515
Within Groups	374	329.5	0.9		
Total	375	329.9			

Note. Due to a lack of samples across designations, age categories were collapsed to either 18-24 or other.

Table 13

One-way Analysis of Variance for Openness to Ideation by Entrepreneurship Education Experiences

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	1.0	1.0	2.163	.142
Within Groups	374	176.4	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	3.4	3.4	3.905	.049*
Within Groups	374	326.4	0.9		
Total	375	329.9			

Note. Due to a lack of samples across designations, entrepreneurship education categories were collapsed to either yes or no. * $p \leq .05$.

Table 14

One-way Analysis of Variance for Openness to Ideation by Academic Major

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.0	0.0	0.002	.967
Within Groups	374	177.5	0.474		
Total	375	177.5			
Post-test					
Between Groups	1	1.7	3.408	1.904	.168
Within Groups	374	328.2	0.873		
Total	375	329.8			

Note. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic major was recategorized into business school or other.

Table 15

One-way Analysis of Variance for Openness to Ideation by Academic Minor

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	1.5	1.5	3.101	.079
Within Groups	374	176.0	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	1.1	3.4	1.246	.265
Within Groups	374	328.8	0.9		
Total	375	329.9			

Note. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic minor was recategorized into business school or other.

Table 16

Descriptive Statistics for Exposure to Entrepreneurship Survey Items

Item	*Yes (%)*	*No (%)*
1) Current personal business ownership	38 (10.1%)	338 (89.9%)
2) Prior personal business ownership	103 (27.4%)	273 (72.6%)
3) Prior or current parent business ownership	166 (44.1%)	210 (65.9%)
4) Prior or current employment by an entrepreneur	186 (49.5%)	190 (50.5%)
5) Prior or current friend or other family business ownership	255 (67.8%)	121 (32.2%)

Table 17

One-way Analysis of Variance for Openness to Ideation by Entrepreneurship Exposure (current personal business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.3	0.3	.675	.412
Within Groups	374	177.1	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	0.4	0.412	.467	.495
Within Groups	374	329.4	0.881		
Total	375	329.9			

Table 18

One-way Analysis of Variance for Openness to Ideation by Entrepreneurship Exposure (prior personal business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.6	0.6	1.281	.258
Within Groups	374	176.9	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	1.9	1.9	2.193	.140
Within Groups	374	327.9	0.9		
Total	375	329.8			

Table 19

One-way Analysis of Variance for Openness to Ideation by Entrepreneurship Exposure (prior or current parent business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.0	0.0	0.002	.967
Within Groups	374	177.5	.5		
Total	375	177.5			
Post-test					
Between Groups	1	0.1	0.1	0.063	.802
Within Groups	374	329.8	0.9		
Total	375	329.9			

Table 20

One-way Analysis of Variance for Openness to Ideation by Entrepreneurship Exposure (current or prior employment by an entrepreneur)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	3.5	3.5	7.567	.006**
Within Groups	374	173.9	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	0.0	0.0	0.015	.903
Within Groups	374	329.8	0.9		
Total	375	329.8			

Note. ** $p \leq .01$.

Table 21

One-way Analysis of Variance for Openness to Ideation by Entrepreneurship Exposure (prior or current friends or other family business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	0.1	0.1	0.176	.675
Within Groups	374	177.4	0.5		
Total	375	177.5			
Post-test					
Between Groups	1	1.7	1.7	1.979	.160
Within Groups	374	328.1	0.9		
Total	375	329.8			

Table 22

One-way Analysis of Variance for Entrepreneurial Intent by Basadur Problem Solving Profile

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	7687.6	7687.6	8.761	.003**
Within Groups	358	314128.1	877.5		
Total	359	321815.7			
Post-test					
Between Groups	1	4977.9	4977.9	5.478	.020*
Within Groups	358	325300.5	908.7		
Total	359	330278.4			

Note. Due to a lack of samples across designations, problem solving profiles were collapsed to implementer/ optimizer and generator/ conceptualizer. * $p \leq .05$. ** $p \leq .01$

Table 23

One-way Analysis of Variance for Entrepreneurial Intent by Gender

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	13929.2	13929.2	16.154	.001***
Within Groups	372	320765.4	862.3		
Total	373	334694.6			
Post-test					
Between Groups	1	17992.3	17992.3	20.552	.001***
Within Groups	372	325676.2	875.5		
Total	373	343668.6			

Note. Due to the low number (2) of other responses, they were not included in the analysis.
*** $p \leq .001$.

Table 24

One-way Analysis of Variance for Entrepreneurial Intent by Ethnicity

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	16.5	16.5	3.781	.053
Within Groups	374	1635.8	4.4		
Total	375	1652.4			
Post-test					
Between Groups	1	15.960	16.0	3.552	.060
Within Groups	374	1680.3	4.5		
Total	375	1696.2			

Note. Due to a lack of samples across designations, ethnic categories were collapsed to either White/ Caucasian or Other.

Table 25

One-way Analysis of Variance for Entrepreneurial Intent by Age

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	6.9	6.9	1.572	.211
Within Groups	374	1645.5	4.4		
Total	375	1652.4			
Post-test					
Between Groups	1	0.6	0.6	0.143	.706
Within Groups	374	1695.6	4.5		
Total	375	1696.2			

Note. Due to a lack of samples across designations, age categories were collapsed to either 18-24 or other.

Table 26

One-way Analysis of Variance for Entrepreneurial Intent by Entrepreneurship Education Experiences

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	70322.0	70322.0	98.541	.001***
Within Groups	374	266899.4	713.6		
Total	375	337221.4			
Post-test					
Between Groups	1	68665.0	68665.0	92.541	.001***
Within Groups	374	277507.4	742.0		
Total	375	346172.4			

Note. Due to a lack of samples across designations, entrepreneurship education categories were collapsed to either yes or no. *** $p \leq .001$.

Table 27

One-way Analysis of Variance for Entrepreneurial Intent by Academic Major

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	2721.0	2721.0	3.042	.082
Within Groups	374	334500.4	894.4		
Total	375	337221.4			
Post-test					
Between Groups	1	6608.2	6608.2	7.278	.007**
Within Groups	374	339564.2	907.9		
Total	375	346172.4			

Note. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic major was recategorized into business school or other. ** $p \leq .01$.

Table 28

One-way Analysis of Variance for Entrepreneurial Intent by Academic Minor

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	994.9	994.9	1.107	.293
Within Groups	374	336226.5	899.0		
Total	375	337221.4			
Post-test					
Between Groups	1	2013.8	2013.8	2.188	.140
Within Groups	374	344158.6	920.2		
Total	375	346172.4			

Note. Due to sample size limitations and varying classifications of academic colleges and schools across institutions, academic minor was recategorized into business school or other.

Table 29

One-way Analysis of Variance for Entrepreneurial Intent by Entrepreneurship Exposure (current personal business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	50301.8	50301.8	65.568	.001***
Within Groups	374	286919.6	767.2		
Total	375	337221.4			
Post-test					
Between Groups	1	30628.9	30628.9	36.303	.001***
Within Groups	374	315543.5	843.7		
Total	375	346172.4			

Note. *** $p \leq .001$.

Table 30

One-way Analysis of Variance for Entrepreneurial Intent by Entrepreneurship Exposure (prior personal business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	75878.1	75878.1	108.587	.001***
Within Groups	374	261343.3	698.8		
Total	375	337221.4			
Post-test					
Between Groups	1	62185.2	62185.2	81.896	.001***
Within Groups	374	283987.2	759.3		
Total	375	346172.4			

Note. *** $p \leq .001$.

Table 31

One-way Analysis of Variance for Entrepreneurial Intent by Entrepreneurship Exposure (prior or current parent business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	10184.9	10184.9	11.647	.001***
Within Groups	374	327036.5	874.4		
Total	375	337221.4			
Post-test					
Between Groups	1	8491.0	8491.0	9.404	.002**
Within Groups	374	337681.4	902.9		
Total	375	346172.4			

Note. ** $p \leq .01$. *** $p \leq .001$.

Table 32

One-way Analysis of Variance for Entrepreneurial Intent by Entrepreneurship Exposure (current or prior employment by an entrepreneur)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	19366.3	19366.3	22.787	.001***
Within Groups	374	317855.1	849.9		
Total	375	337221.4			
Post-test					
Between Groups	1	21331.7	21331.7	24.560	.001***
Within Groups	374	324840.7	868.6		
Total	375	346172.4			

Note. *** $p \leq .001$.

Table 33

One-way Analysis of Variance for Entrepreneurial Intent by Entrepreneurship Exposure (prior or current friends or other family business ownership)

Scale	*df*	*SS*	*MS*	*F*	*p*
Pre-test					
Between Groups	1	8827.8	8827.8	10.054	.002**
Within Groups	374	328393.6	878.1		
Total	375	337221.4			
Post-test					
Between Groups	1	9146.0	9146.0	10.149	.002**
Within Groups	374	337026.5	901.1		
Total	375	346172.4			

Note. ** $p \leq .01$.

Table 34

Summary Significance Results of one-way ANOVA for Demographic Variable Effect on Openness to Ideation and Entrepreneurial Intent

Variable	Openness to Ideation		Entrepreneurial Intent	
	Pre-test	Post-test	Pre-test	Post-test
Problem Solving Profile	.048*	.022*	.003**	.020*
Gender	.751	.262	.001***	.001***
Ethnicity	.517	.829	.053	.060
Age	.452	.515	.211	.706
Entrepreneurship Education	.142	.049*	.001***	.001***
Academic Major	.967	.168	.082	.007**
Academic Minor	.079	.265	.293	.140
Current Personal Business Ownership	.412	.495	.001***	.001***
Prior Personal Business Ownership	.258	.140	.001***	.001***
Prior or Current Parent Business Ownership	.967	.802	.001***	.001***
Prior or Current Employment By an Entrepreneur	.006**	.903	.001***	.001***
Prior or Current Friends or Other Family Business Ownership	.675	.160	.002**	.002**

Note. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.